HICKS-BECTON, LATASHA YVONNE, Ph.D. A Study of the Individual Factors that Contribute to Alcohol Related Risk in College Students. (2019)
Directed by Dr. Kelly L. Wester. 202 pp.

Collegiate alcohol use is a growing concern. Though alcohol use is often considered normative with this population, it is associated with negative consequences including unwanted sexual contact and suicidality (Core Institute, 2013) and as criminal charges for status offenses or driving under the influence. Often, offenses that occur on or near campus are diverted from the criminal justice system and addressed through the student conduct process. University officials mandate students who violate alcohol and/or drug (AOD) policy to interventions designed to reduce alcohol consumption and related negative consequences, yet these interventions are not always successful at doing so (e.g. Bernstein et al., 2017; Borsari et al., 2012, 2016). Variability in the process of assigning students to mandated interventions (e.g. Amaro et al., 2009; Bernstein et al., 2017; Juhnke et al., 2002), prevents assessment of the way intervention assignment practices influence alcohol related outcomes. Moreover, there is no empirically derived method of assigning students to interventions.

In the last decade, however, alcohol consumption (frequency of heavy episodic dinking) and experience of alcohol-related consequences measured on the Young Adult Alcohol Consequences Questionnaire (YAACQ; Read, Kahler, Strong, & Colder, 2006) have been used in research studies to determine risk prior to intervention assignment (Bernstein et al., 2017; Borsari, 2005; Borsari et al., 2016). Although this is a step in the right direction, using solely alcohol consumption and consequences does not fully

account for the context of the student's life or experiences. Risk has also been determined using scores from the Alcohol Use Disorders Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993, Carey, Carey, Maisto, & Henson, 2009); however, this method also fails to consider other factors that contribute to risk ratings among college students (e.g., history of AOD use, family history, drinking motives, and demographic factors such as sex, race, Greek affiliation). While researchers exploring the impact of risk-based assignment to interventions is emerging, knowledge of the impact of this assignment process is limited. And, though these interventions assigned based on risk demonstrated some effectiveness, they do not facilitate improvement for all students (Bernstein et al., 2017; Borsari et al., 2016). Researchers have called for a more multifaceted set of variables to determine risk (Borsari et al., 2016) and assign interventions in order to improve study outcomes, and until now, no such model has been explored.

The purpose of this study was to explore a comprehensive model that takes into account the individual inter- and intrapersonal factors that contribute to risk. Using stepwise logistic regression, this study identified a combination of factors to be used for risk rating determination among a convenience sample of collegiate drinkers. This study also sought to understand differences between risk groups. Risk ratings may be used to assign students to alcohol interventions to improve effectiveness and resource allocation. This calculated risk rating can be used to determine intervention type/assignment, and improve intervention outcomes consistent with Mallet, Bachrach, and Turissi's (2009) suggestion that interventions for risky drinkers may be enhanced or improved by

incorporating more variables (for example intrapersonal variables) that are closely related to intervention outcomes. This study was a first step in efforts to understand how individual factors including demographic factors and intrapersonal factors, interact to explain current and future risk.

Collegiate undergraduates aged 18-25 years old responded to a questionnaire about demographic characteristics, motives for drinking, alcohol-related consequences, and patterns of alcohol consumption. Results of the study indicate individual factors such as freshman classification, biological sex, and motives for drinking may be appropriate screening variables as they are more likely to predict alcohol-related risk than other individual factors including alcohol citation history. These findings are consistent with previous research that identify class year, sex, and drinking motives as predictive of risky alcohol use and alcohol-related problems. Implications for counselors and student affairs staff are discussed in the context of program development and implementation.

Keywords: college, alcohol, sanction, intervention, risk, hazardous drinking, AUDIT, YAACQ, alcohol consumption, alcohol-related consequences, risk-based assignment

A STUDY OF THE INDIVIDUAL FACTORS THAT CONTRIBUTE TO ALCOHOL RELATED RISK IN COLLEGE STUDENTS

by

Latasha Yvonne Hicks-Becton

A Dissertation Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
2019

Approved by

Dr. Kelly L. Wester
Committee Chair

To Charles Edward

APPROVAL PAGE

This dissertation, written by LATASHA YVONNE HICKS-BECTON, has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair__Kelly L. Wester_____

Committee Members__Craig S. Cashwell_____

__Ayesha S. Boyce_____

__David L Wyrick_____

__May 2, 2019_____
Date of Acceptance by Committee

__May 2, 2019_____
Date of Final Oral Examination

ACKNOWLEDGEMENTS

James 1:2-4; Micah 6:8; Hebrews 13:8

As I reflect up on the past four years, I find myself quite overwhelmed. I have to say that writing this acknowledgements page is something that brings me a lot of joy and excitement, and it is also one of the (many) things I have avoided doing because it represents the culmination of this birth and rebirth process for me; it is very much like my rainbow baby. I am grateful to my Lord and Savior Jesus Christ for being consistently with me every moment of this journey. Writing this dissertation (and all of the time and effort leading up to this point) has been an *interesting* process, to put it lightly. There have been trials and tribulations wondrously crafted to help me learn about myself, others, and the world. Despite the challenges, I find each experience to be valuable, and an important part of my growth and development. I am grateful to and for each and every person, situation, and organization that has contributed to this journey for me.

To my doctoral dissertation/advisory committee. God bless all four of you. And me too. I am so thankful for your commitment to getting me through this process.

Dr. Kelly Wester, committee chair extraordinaire, I am forever grateful for your willingness to join me on this journey. I appreciate your commitment to my personal and professional growth through this process. Your ability to meet me wherever I was in each moment – whether that was on the ceiling, in your office chair, standing in your doorway, or exchanging emails and documents when the rest of the world was sleeping is

more valuable to me than I can ever express to you in words. Thank you for believing in me. I am privileged to call you mentor.

Dr. Craig Cashwell, thank you for checking in on me while I was burning the midnight oil. It seems to have been a frequent occurrence over this four-year period, and certainly in the last year. I am grateful for your support and direction as I have developed *The Courage to Teach*. Thank you for being willing to join me on this ride.

Dr. David Wyrick, thank you for inviting me into the IPAHW family with open arms. Dr. Ayesha Boyce, thank you for introducing me to evaluation in a new way. I am grateful to you both for helping me integrate logic modeling, theories of change, and prevention science as I think about my current and future work.

To Current and former CED faculty. I appreciate the effort each of you has put into my growth and development.

Dr. A. Keith Mobley, I am forever grateful for your enduring support and advocacy. I'm grateful for our relationship; it means more to me than you know. Dr. L. DiAnne Borders, thank you for your support as I learned how to be a mother and a doctoral student at the same time.

Dr. Laura Gonzalez, thank you for introducing me to Transition Theory, and, also for the other things – you know. I am grateful. Dr. Connie Jones, I appreciate your support. It has been nice to have someone to talk to about substance use disorders and who gets as excited about teaching as I do. Dr. Carrie Wachter Morris, thank you for letting me sit on the couch in your office and do nothing. It was necessary. Dr. James Benshoff, I appreciate your advocacy. I hope you are enjoying your retirement! Dr.

Murray, thank you for introducing me to Qualtrics. I have learned so many new things since then! Dr. Pamela Harris, your encouragement and support is invaluable.

To all of the CED doctoral students that came before me. Thank you for paving a way! I am especially grateful to Dr. Susan Blake, Dr. Robyn Crowell Lowery, Dr. Rachelle (Shelly) Barnes, and Dr. Edward Wahesh.

To my cohorts. The one I started with, the one I'm finishing with, and the cross-generational one I have created for myself. You each have a special place in my heart.

To my friends, family, and friends that are like family. It would take me more pages than I have in the text of this dissertation to address you all directly. I am grateful for each of you.

Dara, thank you for being my cheerleader. I love you, Ace.

Lis and Nensi, I don't think I am allowed to write those things here, ha! Thank you for taking my calls. Thank you for Carrabba's. I will never forget that day!

Caresse, thank you for introducing me to Noisli.

Xi Beta, Butterfly Doctors, thank you. #FAML

Dr. Laverne Collins, Dr. Jennifer Whitney, Dr. Stephanie Lusk, Dr. Michelle Wade, Dr. Stephanie Dailey, you know. Thank you.

To my parents. Thank you for encouraging me to reach for the stars.

Momma (and Sean), Nanna, I did it! Thank you for believing in me. Team Thomas, I appreciate your prayers and your support. You never had doubts, even when I was so full of them. Here's to the next tee-shirt you get, Mom. Mom and Nanna, you have supported my educational pursuits for as long as I can remember. I am happy to be

able to share this milestone with you. I wish Dad was here to share it with us. I am confident, however, that his spirit lives on in his namesake.

Sheldon, thank you for taking this ride with me. I am forever grateful for your support and encouragement through this process. Thank you for letting me sleep in or taking Charles out so I could work. Thank you for listening to *all of the things*. It means so much to me

Charles, my sweet baby boy, I feel like you have earned this degree as much as I have. When I started this process, you were but a toddler, not quite three years old. As I reach the end of it, I find you looking over my shoulder reading journal articles and asking me what the words mean. You understand more about this process in this moment than I think I did when I started, ha! My heart was so full the day you said, "when I grow up, I want to be a Doctor of Philosophy like Mommy!" I wish you the best on that journey or wherever else life takes you. This dissertation is for you, son.

I can, and I will. Watch me.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

CHAPTER I

INTRODUCTION

Alcohol use is a pervasive concern with collegiate populations. Though excessive alcohol use with this population is often seen as an age-graded ritual or rite of passage for many college students, alcohol use is associated with experience of negative consequences, some of which are severe. Findings from a national survey of collegiate undergraduate students (Core Institute, 2013) indicated that over 80% of surveyed students consumed alcohol in the last year, 68% in the past 30 days, and 60.3% of students under the age of 21 consumed alcohol in the last 30 days. Over 42% of students reported having consumed five or more drinks in one sitting in the past two weeks. Additionally, over 30% of students in the 2013 study reported experiencing some form of public misconduct in the last year as result of drinking or other drug use and 21.5% reported serious consequences such as suicidality, unwanted sexual contact, or otherwise being hurt or injured (Core Institute, 2013). Quantity, frequency, and intensity of substance use and experience of problems related to alcohol and/or other drug use (AOD) are a serious concern. Given the prevalence of AOD use and associations between use and negative outcomes, it is important to identify ways to reduce the quantity, frequency, and intensity of substance use as well as the experience of negative consequences.

To address this issue, there are federal regulations in place with mandates for institutions of higher education (IHEs) to provide prevention education for AOD use as well as intervention programs (The Drug-Free Schools and Communities Act Amendments of 1989; DFSCA) for students who demonstrate risk for future problems as evidenced by violation of established campus policies for alcohol and/or other drugs. The federal guidelines (DFSCA) allow IHE freedom to determine interventions and make decisions about how students are assigned to interventions; however, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) publishes recommendations based on comprehensive reviews of individually focused interventions for collegiate populations (Larimer & Cronce, 2002, 2007). Recommended interventions include Brief Motivational Interventions (BMIs) with personalized feedback, multicomponent skills-based interventions with norms clarification, and interventions designed to challenge alcohol expectancies. These recommendations are applicable for primary prevention (to reduce the likelihood of problematic AOD use for college students in general) as well as secondary prevention (to reduce the risk of problem development or escalation for students who demonstrate additional risk) for mandated students (Barnett & Read, 2005; Carey, Garey, Scott-Sheldon, Elliott, & Carey, 2016). Although intervention strategies vary among IHEs with the use of mandatory group educational or skills-based interventions (Asher, 2008; Juhnke et al., 2002) or individual interventions (e.g. Amaro et al., 2009; Borsari, 2005; Dimeff, Baer, Kivlahan, & Marlatt, 1999; Juhnke & Reel, 1999), brief motivational interventions (BMIs) with personalized feedback seem to be the most promising and recommended approach (Cronce & Larimer, 2011; Larimer & Cronce,

2007) for reducing alcohol consumption and related consequences with mandated students. Unfortunately, however, there is no consensus on the approach to assigning students to interventions, and a lack of understanding of the factors that contribute most to intervention effectiveness.

Intervention Assignment

With no consensus on how to assign students to interventions, the approach to intervention assignment varies among institutions; there is, however, documentation in the scholarly literature of intervention assignment based on policy violation type and history, or alternatively as a matter of procedure. For some institutions, the determination is made based on the student's history of being charged with a policy violation, the substance(s) involved in the violation, and if the violation is considered minor or more severe (e.g. Asher, 2008; Carey et al., 2016; Juhnke et al., 2002). Often, standard education-focused or multicomponent interventions delivered electronically or face to face in either an individual or group format (Barnett & Read, 2005; Freeman, 2001; Juhnke & Reel, 1999) are assigned to students responsible for their first relatively minor infraction of institution alcohol policies. Subsequent violations, more serious first violations, or violations that include drugs, however, are typically met with a different response. Specifically, a more intensive assessment and individually focused intervention (Borsari et al., 2016; Juhnke et al., 2002) designed to assess the impact of use, increase motivation, and reduce overall impact of alcohol use is used.

Interventions may also be assigned as a matter of procedure or standard course of action. For example, at Shaw University, there is a standard sanctioned intervention for

violations involving alcohol or marijuana (with exception of selling/trafficking drugs on campus which results in expulsion) (personal communication, W. Grant on September 13, 2018). Each student is required to complete an assessment instrument and interview, four group counseling sessions, and a follow up individual meeting at the conclusion of the group process. The counselor would then make recommendations for some students to continue with individual counseling if it seemed necessary (personal communication, W. Grant on September 13, 2018). In this example, there is no differentiation based on the substance, recidivism, or severity of the violation, and no replicable assessment of intervention outcomes. The use of individual counseling as an addendum to the established process suggests that there may have been unassessed individual factors impairing the effectiveness of the standardized intervention process. So, it may be important to understand individual factors related to substance use in order to tailor interventions to meet students' needs. This understanding can only be accomplished with individually-focused assessment of related factors.

Variance among intervention strategies and assignment practices are a limiting factor in determining intervention efficacy. Assigning interventions based solely on offense severity or recidivism, or with no regard to offense at all, may be insufficient for understanding or meeting individual students' needs and evaluating intervention effects. As noted two decades ago, when students are assigned to general group education interventions or individual counseling based on offense severity or recidivism, there may be no real assessment of current or historical alcohol use or problems and, consequently, no comparative assessments post intervention (Freeman, 2001; Juhnke et al., 2002;

Juhnke & Reel, 1999). Because there is no outcome data, it is impossible to empirically determine the impact of the intervention on the student's behavior or if students are getting their individual needs met. In fact, in some cases, there is only an evaluation of satisfaction and anecdotal report of reductions in alcohol use (Freeman, 2001; Juhnke et al., 2002).

Additionally, when students are assigned without regard to offense at all (personal communication, W. Grant on September 13, 2018), the intervention may not be sufficient for meeting the students' needs. Indeed, assigning interventions based solely on offense severity, recidivism, or as a matter of procedure may fail to identify students with the greatest risk for alcohol related problems (hazardous consumption, alcohol use disorder, or other problems). Additionally, as result of this failure to identify students with the greatest risk, interventions may fail to make large impacts on alcohol consumption or consequences, and due to lack of individualized screening or assessment precludes the assessment of alcohol-related outcomes. While there may have been some shifts in assessment practices prior to intervention assignment at the university level over the past several years, there is no documentation of these changes in the scholarly literature.

Intervention development, assignment, and evaluation has progressed over the past two decades (Barnett & Read, 2005; Carey et al., 2016) and there is an increased focus on the efficacy of BMIs and BMI components (Carey, Carey, Henson, Maisto, & DeMartini, 2011; Martens, Smith, & Murphy, 2013; Ray et al., 2014). The lack of assessment prior to intervention assignment and failure to assess pre- and post-intervention outcomes has been resolved with the advent of BMIs designed to focus on

individual alcohol consumption and consequences (e.g. Borsari et al., 2014; Dimeff et al., 1999; LaBrie, Tawalbeh, Shelesky, Pedersen, & Hummer, 2010); however, there have been no evident solutions to the issue of addressing individual student needs in the intervention assignment process. Each of the cited studies demonstrates the efficacy of the studied intervention at reducing alcohol consumption and/or alcohol related consequences for most students, but there are only cursory statements that individual factors not previously considered may have impacted intervention outcomes.

Intervention Purpose and Effects

Regardless of intervention approach**,** secondary prevention interventions for AOD policy violations are designed to increase knowledge of the effects of alcohol (and other drugs) on the body as well as reduce quantity, frequency, and intensity of alcohol consumption and alcohol-related problems (Dimeff et al., 1999; Doumas, Turrisi, & Wright, 2006; Juhnke & Reel, 1999; Yusko, Buckman, White, & Pandina, 2008b). Education focused interventions have some effect of increasing knowledge and awareness and may have some impact on attitudes toward AOD use or policy, but researchers have failed to measure changes in alcohol consumption and consequences (Barnett & Read, 2005) or other outcomes. By contrast, BMIs include measurements of consumption and related problems at the outset of the intervention as a matter of protocol (Dimeff et al., 1999) followed by education about the impact of AOD on the body, often with personalized feedback. The inclusion of outcome measurements pre-intervention may be why BMIs are among the most researched interventions for collegiate alcohol use (Carey et al., 2011; Carey, Carey, Maisto, & Henson, 2006; Carey et al., 2016). In

addition to the standard pre-intervention measures, BMIs in research studies also include post-intervention outcome measures of alcohol consumption and alcohol-related consequences (Bernstein et al., 2017; Borsari, 2005; Carey et al., 2016), so pre- and post-intervention measures are analyzed to determine intervention effectiveness for improving alcohol related outcomes.

BMIs tend to be effective at reducing quantity/frequency of alcohol use or alcohol-related problems (Amaro et al., 2009; Bernstein et al., 2017; Borsari et al., 2014; LaBrie et al., 2010), but not for all students. This lack of effect for BMIs for some students may be due to interference from the myriad of other factors such as biological sex, psychosocial history and intrapersonal factors, attitudinal beliefs, or other cognitive factors such as drinking motives related to substance use or related problems (Borsari et al., 2007; Capone & Wood, 2008; V. V. Grant, Stewart, O'Connor, Blackwell, & Conrod, 2007; Mallett, Bachrach, & Turrisi, 2009; Scaglione et al., 2015; Weitzman, Nelson, & Wechsler, 2003). These factors independently predict, or are moderators or partial mediators, of alcohol consumption and/or consequences, (Carey et al., 2009, 2016; Doumas, 2017), and, accordingly, may be useful to consider when tailoring interventions to individual needs. In some studies, factors that may influence or predict outcomes (alcohol consumption, consequences, and alcohol use disorders) are included in assessment, analysis, and interpretation of study results (Doumas, 2017a), however, this is not true in all cases (e.g. Bernstein et al., 2017; LaBrie, Thompson, Huchting, Lac, & Buckley, 2007). Despite knowledge that individual factors may influence alcohol consumption, consequences, and risk for escalation of use, there is no documentation in

the scholarly literature of these individual factors being considered when screening students or when making assignments to mandated interventions. Hazardous use of alcohol (defined as AUDIT score of 8 or more) has, however been used as a potential moderator for intervention outcomes (Carey et al., 2009) and was suggested for use as a screening tool prior to intervention assignment (Hagman, 2016).

The Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) performs well as a screening tool for hazardous drinking in college students (Demartini & Carey, 2012). Quantity, frequency, and intensity of drinking as well as typical blood alcohol content (BAC), age of first drink, and experience of other alcohol related problems are positively associated with scores on the AUDIT (DeMartini & Carey, 2009) Thus, in addition to potential utility as a screening tool for intervention assignment, AUDIT scores may serve as an appropriate pre-and post-intervention outcome variable. AUDIT scores have been used both as an outcome measure and as a screening tool in studies of collegiate alcohol use (Carey et al., 2009; DeMartini & Carey, 2009; Hagman, 2016). However, with few exceptions (e.g. Carey et al., 2009), AUDIT scores have not been considered in efficacy or effectiveness studies of mandated interventions for college students. Although Carey et al. (2009) recommended for use of the AUDIT as a screening tool prior to intervention assignment a decade ago, there are no known studies that consider AUDIT scores as a factor when assigning students to interventions or tailoring the intervention approach to meet student's needs. In fact, with little exception (DeMartini & Carey, 2009), AUDIT scores are not being used to assess level or risk or outcomes in intervention studies.

Additionally, AUDIT scores (and risk status) may not effectively account for individual factors contributing to hazardous drinking.

Although the AUDIT is not being used frequently to determine risk level in intervention studies, there are some studies of risk-based assignment using other variables. Frequency of heavy episodic drinking (HED) defined as four or more drinks in one sitting for females and five or more drinks in one sitting for males (NIAAA, 2015) and sum score of alcohol related consequences experienced on the Young Adult Alcohol Consequences Questionnaire (YAACQ) within the last 30 days have been used as *tailoring variables* (Borsari, 2005) to determine risky drinking in mandated college students. Based on this combination of variables, students were determined to have risky drinking patterns definable as *high risk* or to have *low risk*. The dichotomous risk rating was used to determine subsequent intervention assignment for mandated students (Bernstein et al., 2017; Borsari, 2005; Borsari et al., 2012, 2016).

Effectiveness of Risk-Based Intervention Assignment

There is a budding body of literature about a) risk-based assignment to interventions in effectiveness studies and b) identifying and controlling for factors that predict alcohol related outcomes. Levels of risk (high or low) using alcohol consumption and consequences as tailoring variables have been used to determine intervention assignment with lower risk students being assigned to less intensive interventions and higher risk students being assigned to more intensive interventions (Bernstein et al., 2017; Borsari, 2005). This risk rating approach has been used in studies about stepped care where all participants receive brief advice at step one and some participants receive a

stepped-up BMI (step two) based on assessment of risk six weeks later (Borsari, 2005). Similarly, frequency of HED and experience of alcohol related consequences were used to determine if a participant had low risk and was assigned to a group BMI or high risk and was assigned to individual BMI (Bernstein et al., 2017). Despite being assigned to a more intensive intervention on the basis of this risk determination, however, not all students in the higher risk intervention group experienced reductions in alcohol consumption or alcohol-related problems (Bernstein et al., 2017; Borsari et al., 2012a, 2016). The lack of effect for some students suggests a need for consideration of other or additional factors to determine risk.

Tailoring Variables

Using alcohol consumption and alcohol related consequences as tailoring variables for pre-intervention risk assessment may seem appropriate as they are the targeted outcome variables for BMIs; however, this may not be the best approach. Overall, in effectiveness studies that used risk-based assignment, student participants experienced a reduction in alcohol consumption and alcohol related problems (e.g., Bernstein et al., 2017; Borsari, 2005; Borsari et al., (2016). However, though Borsari et al., (2016) found higher risk drinkers benefited from BMI by way of reduction in quantity of alcohol-related consequences, alcohol related consequences were not totally eliminated; and for some students, HED actually increased following the BMI. Bernstein et al., (2017) also used alcohol consumption and experience of alcohol-related problems as tailoring variables to determine assignment to a group- or individual- BMI. They found that though there were reductions overall in measures of consumption and alcohol

related problems for both intervention conditions, for some students, there was a transition from being a low-risk drinker to a high-risk drinker (n=19; 11% of low risk participants, and 30% of students in the high risk group at baseline remained in the high risk group at 30-day follow up (Bernstein et al., 2017). Bernstein et al. do not make suggestions for the lack of effect with some students, but do assert that interventions for mandated students should be matched to level of need as suggested by Borsari et al., (2012a). Borsari and colleagues (2016) speculated about the reasons for lack of positive response to the sequentially administered BMI and suggest that it may be due to using only alcohol consumption and related problems as tailoring variables for risk rating determinations. Further, they suggested that future researchers empirically assess a more multifaceted set of tailoring variables, perhaps specifically including the violation/offense as a consideration rather than a simple summary of problems (such as when the YAACQ sum scores are used) (Borsari et al., 2016). In addition to this suggestion, it may be appropriate to include other individual factors such as drinking motives or family history which have been associated with frequency/intensity of drinking as well as alcohol-related problems (Carey, Henson, Carey, & Maisto, 2010; B. F. Grant et al., 2015; V. V. Grant et al., 2007) in pre-intervention assessments in order to appropriately assign interventions for mandated students. Additionally, it may be helpful to include other factors (individual variables) that are known to predict, mediate, or moderate alcohol consumption or related consequences.

Researchers on risk and protective factors (Scaglione et al., 2015) and in intervention studies (Bernstein et al., 2017; Borsari et al., 2016) have suggested

alternative variables be used for identification of risk. Unfortunately, however, they do not make specific suggestions for which variables are best used for level or risk determination, merely suggesting that alternatives should be explored in future research. Scaglione et al (2015) suggest that "the person-centered approach offers a more refined assessment of risk, which can be used to develop more nuanced screening criteria for target interventions" (p. 2044). Thus, based on risk factors identified in the screening assessment process, assignment to risk level and consequently to interventions can target students with the highest risk.

Missing Factors in Effectiveness Studies

As previously discussed, there are many factors that predict quantity, frequency, and intensity of alcohol consumption as well as alcohol-related problems; however, these factors were not always considered in study outcomes or used as covariates in analysis. Interestingly, descriptive information about participants is often collected (age, race, residence status, Greek affiliation, gender, and weight) (Carey et al., 2016; Doumas, 2017; Yusko et al., 2008b). Aside from gender (e.g. Carey, Carey, Maisto, & Henson, 2006; Carey & DeMartini, 2010), however, none of the other known predictors of alcohol related outcomes were included in analysis.

Moderator analyses in various studies (Borsari et al., 2012a; Carey et al., 2011) included several known predictors of alcohol related outcomes, but, drinking motives were not assessed or considered. Borsari et al (2012) considered gender, age of initiation of alcohol use, sensation seeking, individual costs and benefits of change, and reasons for limited drinking (reasons <u>for not</u> drinking, rather than reasons/motives <u>for</u> drinking) as

moderators for the impact of BMI on HED and peak Blood Alcohol Content (pBAC) and found that none of these variables were significant moderators; however, drinking motives (V. V. Grant et al., 2007) and other intrapersonal factors (Mallett et al., 2009) known to predict alcohol use and alcohol related problems were not assessed. Drinking motives were assessed in intervention studies by LaBrie (2007, 2010); however, they were not considered as covariates in the mandated sample. In other words, researchers who have utilized risk-based assignment have included alcohol consumption and number of alcohol-related consequences experienced as tailoring variables for determining risk (Bernstein et al., 2017; Borsari, 2005; Borsari et al., 2016), but have not considered other individual factors and intrapersonal factors. Accordingly, drinking motives and other individual factors need to be assessed and included in risk as they may contribute to alcohol related outcomes.

Statement of the Problem

University officials mandate students who violate alcohol and drug policy to interventions designed to reduce risk associated with alcohol consumption, yet these interventions are not always successful at reducing alcohol consumption and related consequences. There is variability in the process of assigning students to mandated interventions (Amaro et al., 2009; Bernstein et al., 2017; Borsari et al., 2012a; Freeman, 2001; Juhnke et al., 2002), and there is no assessment of the way the intervention assignment practices influence outcomes. Moreover, there is no empirically derived method of assigning students to interventions. In the last decade, however, there have been studies of tailored assignment to interventions based on risk defined by a

combination of alcohol consumption and experience of alcohol-related consequences (e.g. Bernstein et al., 2017; Borsari, 2005; Borsari et al., 2016).

There is a limited but growing body of research about assigning students to alcohol interventions based on an assessment of risk. Researchers have investigated the efficacy of interventions for improving alcohol-related outcomes when interventions are assigned based on risk, yet these interventions do not demonstrate effects for all students. The lack of effect for some students (Bernstein et al., 2017; Borsari et al., 2012, 2016) may be due to using an inadequate combination of factors to determine intervention assignment. Additionally, there has been a suggestion of risk assessment or screening for interventions based on AUDIT scores (DeMartini & Carey, 2009; Hagman, 2016). Unfortunately, however, there are no known studies of intervention assignment based on AUDIT results. Using solely consumption and consequences as tailoring variables may not be sufficient for determining risky drinking. Researchers have called for empirical assessment of a more multifaceted set of tailoring variables to determine risky drinking, subsequent intervention type/assignment, and improve intervention outcomes for college students (Borsari et al., 2016). Understanding how the individual demographic, psychosocial, and cognitive factors work together to determine risky (hazardous) dinking will help researchers, counselors, and student affairs administrators make decisions about risk assessment and subsequent intervention assignment. For the purposes of this study risk is defined 1) by AUDIT scores, and 2) as defined by *high* and *low* risk described in Bernstein et al. (2017).

Purpose of the Study

The purpose of the study is to understand how identified intrapersonal factors contribute to current risk as well as risk for future problems related to alcohol use. In doing so, the goals are to a) identify which tailoring variables predict risk for hazardous drinking as defined by i.) Alcohol Use Disorders Identification Test (AUDIT) score of greater than or equal to 8 and ii.) experience of two or more heavy episodic drinking episodes and five or more YAACQ problems in the past 30 days (Bernstein et al., 2017) and b) identify a parsimonious model for each risk type, and c) to identify which variables are similar between models.

This study is a first step in efforts to understand how individual factors including demographic factors and intrapersonal factors, interact to explain alcohol-related risk for college students. Identifying a model that explains risk will help us to identify variables that contribute to risk for problem development and other serious consequences in college students. Subsequently, researchers and clinicians may be able to identify appropriate tailoring variables for utilization in determining risk ratings which may be used for assigning mandated interventions to college students who violate university AOD policies. This study will contribute to the growing body of literature about relationship between individual factors and drinking outcomes.

Need for the Study

There is a need to expand the factors utilized for risk determination and assignment to mandated alcohol interventions. Risk has typically been defined by a combination of student alcohol consumption and experience of alcohol related

consequences (Bernstein et al., 2017; Borsari, 2005; Borsari et al., 2012). Using solely consumption and consequences as tailoring variables may not be sufficient for determining risk, and researchers have called for empirical assessment of a more multifaceted set of tailoring variables to identify risk (Borsari et al., 2012), and assessment of their decision rules for use with college students. This calculated risk rating can be used to determine intervention type/assignment, and improve intervention outcomes consistent with Mallet, Bachrach, and Turissi's (2009) suggestion that interventions for risky drinkers may be enhanced or improved by incorporating more variables (for example intrapersonal variables) that are closely related to intervention outcomes. This study will be a first step in efforts to understand how individual factors including demographic factors and intrapersonal factors, interact to explain current and future risk.

This study will contribute to the growing body of literature about relationship between individual factors and drinking outcomes by identifying a model that more fully explains risk. The results will help to identify variables that contribute to risk for problem development and other serious consequences in college students. Additionally, we may be able to understand how proposed tailoring variables have differing patterns between previously identified risk groups. Subsequently, researchers and clinicians may be able to identify appropriate tailoring variables for risk assessment and subsequent intervention assignment. Furthermore, results may allow student affairs staff to ensure students with higher levels of risk get assigned to interventions that are likely to meet their individual needs and ensure conservation of resources by assigning students with

lower level or risk to less intensive interventions and improvement of outcomes by identifying intervention targets.

Research Questions

Research Question 1A: Which set of variables predict hazardous drinking? [stepwise logistic regression]

Research Question 1B: Which set of individual factors are included in the most parsimonious model for identification of students with hazardous drinking patterns? [stepwise logistic regression with backward elimination]

Research Question 2A: Which set of variables predict high and low risk patterns of alcohol use as defined by frequency of HED and sum of YAACQ experiences drinking in the last 30 days? [stepwise logistic regression]

Research Question 2B**:** Which set of variables is the most parsimonious for identifying students with high vs. low risk patterns of alcohol use as defined by of frequency of HED and sum of YAACQ experiences in the past 30 days? [stepwise logistic regression with backward elimination]

Research Question 3: What are the differences between the models identified in RQ1A, RQ1B, and RQ2? [visual inspection of model differences]

Definition of Terms

Tailoring variables are combinations of individual factors including measures on assessment instruments used to determine risk levels for students prior to assigning them to interventions.

Drinking motives are the reasons why a person consumes alcohol and are measured by the Modified Drinking Motives Questionnaire-Revised (V. V. Grant et al., 2007). Drinking motives were identified based on the Motivational Model of Alcohol Use (Cox & Klinger, 1988) and can be described as internal or external, and positively-or negatively-reinforcing. Specific classifications of drinking motives have developed over time from the initial 3 factor model (Cooper, Russell, Skinner, & Windle, 1992), to 4 factors (Cooper, 1994), and finally to the five-factor model (Blackwell & Conrod, 2003) which was modified and validated by V. V. Grant et al., (2007) to form the model used here. Drinking motives are classified as social motive, enhancement motives, conformity motives, coping-depression motives, and coping-anxiety motives.

Alcohol related consequences are negative experiences in a person's life related to alcohol use and are measured by the Young Adult Alcohol Consequences Questionnaire (Read et al., 2006). This is a 48-item dichotomous response instrument designed to understand a person's experience of various alcohol-related consequences within a specified time frame. For the purpose of this study, the designated time frame is 30 days.

AOD policy violation is measured by 1) students' report of whether or not they have been charged by a university official with a code of conduct violation. University officials include university police, housing and residence life staff, and conduct offers and 2) self-report of having acted in violation of policy even when one has not been charged or cited by a university official.

Heavy episodic drinking (HED) is also known to the public as *binge drinking* and is defined by NIAAA as the consumption of four or more alcoholic beverages in a two-hour period for females and five or more alcoholic beverages in a 2-hour period for males. This pattern of alcohol consumption brings the typical person's blood alcohol concentration (BAC) level to 0.08 grams per deciliter. HED is measured by self-report of the number of times a person has engaged in HED in the past 30 days.

Hazardous drinking is a pattern of alcohol use likely to result in increased problems for the user. It is defined as a score of 8 or more on the measured by the AUDIT (Saunders et al., 1993).

High or low risk drinking ratings are determined by a combination of YAACQ items experienced in the past 30 days and frequency of HED in the past 30 days. Participants who experience or report two or more HED events and 5 or more experienced consequences in the past 30 days are considered to have a risky pattern of alcohol use and are identified as high risk. All others are identified as low risk.

CHAPTER II

REVIEW OF THE RELEVANT LITERATURE

This chapter presents a review of relevant literature including the prevalence of alcohol consumption and related consequences as well as individual factors associated with alcohol consumption. Theories of intervention design are discussed with an overview of intervention outcomes and evaluation processes. Two theories of development are presented in the context of its influences on students' response to alcohol related events in the collegiate environment.

Social Issue

Alcohol (and other drug) use among collegiate populations is a common occurrence among college students. In a national survey (Core Institute, 2013), 80% of college students reported consuming alcohol within the past year, and 68% reported consuming alcohol with the past 30 days. Though many students do not consume alcohol at high levels, 42% of students in this national survey reported consuming five or more drinks in one sitting within the past two weeks, which would be categorized as heavy episodic drinking (HED). These high rates of drinking are not limited to students who are of legal age to drink, as 60.3% of college students under the age of 21 reported having consumed alcohol in the past 30 days (Core Institute, 2013). This level of drinking is concerning given that college students tend to drink more than their same-aged peers who

about drinking behavior are related to increased alcohol consumption (Borsari & Carey, 2003; Dams-O'Connor, Martin, & Martens, 2007; Fearnow-Kenney et al., 2016), particularly for college students in highly social groups such as athletes or members of social fraternities or sororities (Greek Letter Organizations, GLOs)(Fairlie, DeJong, Stevenson, Lavigne, & Wood, 2010). Students in highly social groups drink at higher rates than the general collegiate population (Buettner, Bartle-Haring, Andrews, & Khurana, 2010).

Often, alcohol consumption results in a number of negative alcohol-related consequences for college students (Kahler, Hustad, Barnett, Strong, & Borsari, 2008; Lee et al., 2017; Read et al., 2006). Consequences include problems with class attendance and academic performance (grades), forgetting, social problems, and legal problems (Read et al., 2006), as well as sexual victimization and other serious problems (Eaton et al., 2015; Read et al., 2006). Specifically, 30% of students experienced some form of public misconduct in the last year as result of drinking or other drug use, and 21.5% reported serious consequences such as suicidality, unwanted sexual contact, or otherwise being hurt or injured (Core Institute, 2013).

Negative consequences of use are particularly evident in heavier drinkers as college students who engage in heavy episodic drinking are more likely to experience negative alcohol-related consequences (Wahesh & Lewis, 2015). So, quantity, frequency, and intensity of alcohol consumption is a serious concern; yet these factors are not the only aspects to consider. Motives for drinking also impact the experience of negative alcohol-related consequences. For example, Wicki et al. (2017) identified that

adolescents who drank to cope with negative emotions were more likely to experience negative consequences than individuals who drank for other reasons regardless of the amount consumed. Similarly, Merrill, Wardell, and Read (2014) found a direct relationship between drinking alcohol to cope with negative emotions (i.e., coping motives) and experience of negative alcohol related consequences among college students. There was also an indirect relationship between enhancement motives (drinking to improve affect) and alcohol-related consequences via alcohol-consumption. So, people who drank to improve mood consumed more alcohol and experienced more consequence as a result (Merrill, Carey, Lust, Kalichman, & Carey, 2014). These findings suggest that more information about the reasons why someone engages in alcohol consumption may be needed in better understanding why a person may drink alcohol, and thus experience negative consequences. Given the prevalence of alcohol consumption in collegiate populations and associations between alcohol consumption and negative consequences or outcomes, it is important to identify ways to reduce the quantity, frequency, and intensity of substance use as well as the experience of negative consequences.

Drug Free Schools and Communities Act (DFSCA)

The DFSCA identifies expectations for Institutions of Higher Education (IHE), with a primary goal of ensuring an alcohol and other drug free environment for students and staff. IHEs must adhere to federal guidelines to ensure continued access to federal funding. As part of the regulations, universities are required to provide alcohol and other drug (AOD) prevention programs to students and employees. In addition to preventative

education about the potential personal consequence of AOD use, there must be a policy that outlines local, state, and national law and possible legal sanctions as well as institutional policies and potential sanctions for policy violations. Annual notification of the policy is required, and resources for people who would like assistance with AOD related problems must be identified. If an IHE fails to meet the requirements of the act, the institution may lose access to federal funding (DFSCA, 1989). Though there are guidelines for what must be included in AOD policies, each college and university has freedom to implement the policy requirements as they see fit. With this variation and flexibility, it is challenging to adequately measure the impact of AOD prevention and intervention activities on college drinking.

Freedom in Implementation

Universities have the freedom to make their own decisions about the way they plan and implement their AOD policies as long as they meet the minimum federal requirements. Prevention education is usually included within the policy itself as a list of the potential health, social, academic, and legal risks associated with AOD use. In addition to education within IHE policy, prevention education may also occur via an educational presentation or web-based program. For example, UNCG requires all first year and transfer students to complete AlcoholEdu for College™ as part of their primary prevention program. AlcoholEdu for College™ is an individually delivered web-based program designed to educate students about the impact of alcohol on the body, provide normative education, introduce protective behavioral strategies and reduce the likelihood of risk associated with drinking. AlcoholEdu for College™ also includes an online

resource center for students that includes the local/university AOD policy and sources for support. Prevention education is important given that students who had not completed AlcoholEdu for College™ were 4.64 times more likely to experience an alcohol-related event than students who had completed it (Abrams, Kolligian, Mills, & DeJong, 2011). Thus, university administrators are motivated to include educational prevention programs in their array of services.

In addition to primary prevention programs, institutions are required to have policies that outline the process or interventions for students and staff who evidence behaviors contrary to law or institutional policy (DFSCA, 1989). Student issues are handled by way of institutional judicial processes. Judicial processes are typically outlined in an institution's student code of conduct or student handbook. Codes of conduct vary among IHEs; however, they must prohibit illegal substance use (DFSCA, 1989). So, alcohol use by a person under the age of 21 is *always* prohibited. Similarly, being in the presence of alcohol under the age of 21 is prohibited and is generally considered a minor violation. Possession or use of other drugs is also prohibited for all enrolled students, regardless of age. Behavioral expectations are also identified with an IHE's code of conduct. In general, student conduct violations that include multiple offenses or a combination of substance use and other behavioral concerns are considered more severe in comparison to minor violations (Freeman, 2001; Juhnke et al., 2002); however, similar to prevention programming efforts, the interventions offered as result of the judicial process vary among institutions.

Secondary prevention or early intervention activities are designed to reduce alcohol consumption and experience of alcohol-related problems (Dimeff et al., 1999). Interventions may include a variety of components delivered in person, via web, through written/printed materials, or phone. They may be personalized or generalized and may be delivered in individual or group settings. Content of interventions generally include an education component about the impact of AODs on the body, information about the risks of AOD use and other targeted intervention designed to reduce the quantity and/or frequency of alcohol use or alcohol-related problems. Though students may voluntarily request intervention services, there is evidence to suggest that college students rarely seek help for substance related concerns despite the severity of associated consequences without formal or informal pressure to do so (Caldeira et al., 2009). Thus, students who engage in secondary prevention services are often mandated to do so (i.e., sanctioned to interventions) through the university's student conduct or judicial process. This judicial process is pre-established by IHEs as required by the Drug Free Schools and Communities Act Amendments (1989).

Providing an array of services for AOD prevention and intervention is consistent with the development and application of good prevention programs (Hogan, Gabrielsen, Luna, & Grothaus, 2002). Hogan et al. stated that it is important to offer multiple services, as no one program, workshop, policy, or other intervention can prevent problem development in and of itself. Thus, providing a variety of prevention and intervention programs on a college campus for AOD use may help in meeting the various needs of students.

Prevention programs need to be framed to address multiple levels or spheres of influence identified in the theory of social ecology (Bronfenbrenner, 1979), which has been expanded to be used as a framework for designing disease prevention and health promotion programs (McLeroy, , Bibeau, Daniel, Steckler, Allan, & Glanz, Karen, 1988). This social ecological model has been used for a variety of prevention programs and is frequently used for alcohol and drug-related programming such as the comprehensive program Heads UP (LaBrie et al., 2010), with some slight modifications to address contextual and cultural needs of the population. Comprehensive prevention programs include activities and programs across the range from universal prevention to target prevention – which is equitable to intervention for high-risk population and might include a social norms marketing campaign, a prevention education program, community collaboration for policy decisions and implementation, and an intervention program for students who violate policy (see LaBrie et al., 2010).

Each institution of higher education (IHE) has its own process for determining which sanction(s) a student is required to complete and the time frame in which it should be completed. There are, however, some standards of due process suggested by various professional associations in student affairs or student conduct as well as some recommended interventions from national organizations. Regarding due process, students who are adjudicated responsible for violations of the institutional code of conduct are assigned a variety of administrative or educational sanctions as a form of targeted prevention/intervention. However, the individual (micro-system) contextual factors impacting substance use and surrounding the violation may not be considered

during the decision-making process. For some institutions, the determination is made based on whether or not this is the first policy violation, the substance(s) involved in the violation, and if the violation is considered minor or more severe (e.g. Asher, 2008). At other institutions, for example Shaw University, there is a standard sanctioned intervention for violations involving alcohol or marijuana (with exception of selling/trafficking drugs on campus which results in expulsion) (personal communication, W. Grant on September 13, 2018). While it is common practice among universities to determine intervention services based on the actual violation or as a matter of policy or procedure, this assignment practice does not consider contextual factors that contribute to substance use or how individual differences may impact intervention efficacy.

Though there is freedom among IHEs to design and implement AOD prevention and intervention activities, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) provides some general recommendations for alcohol interventions with college students. The NIAAA recommendations are based on research about interventions for collegiate alcohol use (Cronce & Larimer, 2011; Larimer & Cronce, 2002, 2007). NIAAA recommends the use of Brief Motivational Interventions (BMIs) including personalized feedback, multicomponent skills-based interventions with norms clarification, and interventions designed specifically to challenge alcohol expectancies. These recommended intervention targets have differing theoretical constructs and multiple theoretical targets, which is not uncommon for prevention programs (Hansen, Dusenbury, Bishop, & Derzon, 2007). Cronce and Larimer's (2011) review of the literature on individually focused approaches to the prevention of college drinking

included 17 intervention studies with 20 unique BMIs compared to other intervention types and found that BMIs tended to have the most promising results. BMIs also seem to be the most studied interventions for collegiate alcohol use with both voluntary and mandated populations. In fact, the Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff, Baer, Kivlahan, & Marlatt, 1999) or modifications of the BASICS BMI are used frequently among IHEs. Overall, BMIs are effective at reducing alcohol consumption and related problems (see for example, Bernstein et al., 2017; Carey, Carey, Henson, Maisto, & DeMartini, 2011; Carey, Garey, Scott-Sheldon, Elliott, & Carey, 2016; Cronce & Larimer, 2011). However, they do not take into account the individual contextual factors that contribute to drinking such as motives for use or personal history such as early experiences with drinking which may contribute to intervention response.

Intervention Assignment

Though intervention assignment practices vary among institutions, there are some common factors that seem to influence or dictate intervention assignment for secondary prevention interventions. Factors that impact intervention assignment include policy violation type and history. Standard educational or multicomponent interventions delivered electronically to the individual or in a group face to face are often used for minor to moderate level infractions involving alcohol at the first violation of campus AOD policy (Borsari et al., 2016; Carey et al., 2011; Freeman, 2001; Juhnke et al., 2002. When it is determined that students are responsible for a second violation of school policy, or the violation is deemed to be a more serious violation (e.g. possession of larger

volumes of alcohol, behavioral problems related to use, or drug use), then the typical sanction is a more intensive intervention in an individual (Freeman, 2001; Juhnke et al., 2002; Juhnke & Reel, 1999) or group intervention format (Amaro et al., 2009). One problem that exists among these listed interventions is there is typically no replicable assessment of intervention effectiveness. In these studies, outcomes were not being empirically assessed at all, regardless of intervention assignment practices (e.g. Freeman, 2001; Juhnke et al., 2002). So, in addition to having no quantifiable measures of effectiveness, there is no way to assess how assigning intervention based solely on AOD violation impacted intervention efficacy.

Alternative to assignment based on specific violation, interventions may be assigned based on institution intervention policies and procedures or research studies that defines the intervention assignment process. The policy may include a standardized sanction for all students with violations that do not require immediate suspension/expulsion as is with Shaw University (personal communication, W. Grant on September 13, 2018) or with Guilford College (personal communication, S. Mencarini on March 26, 2018). For example, while students at Shaw University typically are assigned to a standard intervention based on the specific violation, the counselor also has the discretion to encourage or require additional sessions based on a clinical assessment of the student (personal communication, W. Grant on September 13, 2018). To acknowledge that the initial standard intervention may not be adequate enough for students is an indicator that the assignment to interventions solely as a matter of procedure may not have been sufficient to meet the students' needs, and that more

targeted approaches to student needs and factors related to the students' AOD use may be more important in intervention assignment.

Accordingly, Amaro et al. (2009) compared a BMI (the University Assistance Program; UAP) to services as usual (SAU) which was either a web-based face to face program or group intervention program. For the research conditions, UAP required two sessions for students with their first, relatively minor violation of campus policy and three required sessions for subsequent or more serious violations for students in the treatment condition. Students in the UAP condition may have also had an additional focused intervention based on their initial psychosocial assessment results; however, not all students in UAP received any additional intervention focus, nor were these students analyzed or separated from the larger UAP group in analysis. Overall, students in the UAP reported lower levels of alcohol consumption in the past 90 days than students in the SAU conditions as well as more frequent use of positive coping skills and protective behavioral strategies. Interestingly, reductions in consumption were noted for overall weekly drinking, but there was no overall reduction in weekend drinking or HED. There was a decrease in alcohol-related consequences from baseline to 6 months for the UAP condition, but an increase from baseline to 3 months followed to a return to baseline for the SAU group (Amaro et al., 2009). This immediate reduction, followed by an increase, may be due to regression to the mean or continued HED which is related to increased experience of alcohol-related consequences. Furthermore, even though there is evidence of increased efficacy of the UAP BMI over web and group interventions for mandated students in this study, there was no differentiation in the results for students who were

assigned to the more intensive 3-session intervention than the 2-session intervention. And, there is no comparison or discussion of differences in intervention effects for BMI participants who received additional focused intervention based on their psychosocial assessment results. There is a need to identify how individual psychosocial factors within the micro-system impact the outcome to various interventions. These factors may include aspects such as family history, previous experiences with alcohol, motives for drinking, social group membership, and demographic factors. Understanding the interplay of consumption, consequences, and psychosocial factors may help us to better understand which level of intervention may be most beneficial for specific students.

Intervention Purposes and Effects

Intervention development, assignment, and evaluation has continued to progress over time (Barnett & Read, 2005; Carey et al., 2016). With this progression comes an increased focus on the efficacy of BMIs and BMI components (Carey et al., 2011; Martens et al., 2013; Ray et al., 2014), and an effort to understand intervention design and identify content that will likely improve intervention outcomes (Hansen et al., 2007). While most university interventions for AOD policy violations are not empirically assessed for efficacy (Freeman, 2001; Juhnke et al., 2002), the implementation of BMIs is beginning to resolve this, as most BMIs incorporate an aspect of pre-and post-intervention assessment. As an example, BASICS (Dimeff et al., 1999) is a BMI that has been modified and utilized by IHEs across the country. BMIs by their very design provide education about the impact of alcohol use and include a pre-intervention assessment of alcohol consumption and alcohol-related consequences in order to provide

personalized feedback to the BMI participant (Dimeff et al., 1999). Researchers in BMI studies collect and compare post-intervention measures of alcohol consumption and experience of alcohol-related consequences to pre-intervention measures (Bernstein et al., 2017; Borsari & Carey, 2005; Carey et al., 2016). This intervention design strategy may be the reason why BMIs are among the most frequently researched interventions for college alcohol use (Carey et al., 2011, 2006, 2016).

The pre-assessment of individual alcohol consumption and alcohol-related consequences that occurs within the structure of BMIs potentially allows for individualized intervention assignment (Borsari et al., 2014; Dimeff et al., 1999; LaBrie et al., 2010). Though BMIs yield reductions in alcohol consumption and consequence overall (Bernstein et al., 2017; Borsari et al., 2016; Carey et al., 2016; Dimeff et al., 1999; LaBrie et al., 2010), they do not demonstrate positive effects for all participants, perhaps because of the lack of attention to individual inter- or intra-personal differences among intervention participants such as psychosocial history or drinking motives. As noted earlier, the need to focus on the contextual factors that contribute to an individual's AOD use may be imperative when determining intervention assignment rather than solely determining intervention assignment based on AOD consumption and consequences.

Interventions in general, and BMIs specifically, are designed to increase knowledge of the biological impact as well as potential social and legal consequences of alcohol use and to reduce alcohol use and alcohol-related problems (Ray et al., 2014). Overall, BMIs demonstrate superiority over other types of interventions for reducing alcohol consumption and alcohol-related problems (Carey et al., 2016; Cronce &

Larimer, 2011). Yet, as suggested above, the effects of BMIs are not promising for all students. In some cases, students have experienced no changes, or have increased alcohol use and/or consequences following a BMI (Bernstein et al., 2017; Borsari et al., 2016). Though the effectiveness of the intervention has improved over time, there are some students and groups of students for whom interventions have little to no initial or sustainable reductions in their pattern of use or risk associated with alcohol use (Carey et al., 2009) or who have subsequent AOD Policy violations following an intervention (Borsari et al., 2012). Yet in the majority of studies, these students are not highlighted or discussed, with further exploration into the potential individual factors that may impact the problematic results (Bernstein et al., 2017; Borsari et al., 2012b). Thus, this lack of effect of interventions for some students, (e.g., (Bernstein et al., 2017; Borsari et al., 2012b), may be due to the interaction or interference of selected interpersonal and intrapersonal risk factors (Borsari et al., 2007; Capone & Wood, 2008; V. V. Grant et al., 2007; Mallett et al., 2009; Scaglione et al., 2015).

Over time, scholars have learned more about the factors related to quantity, frequency, and intensity of alcohol use and alcohol-related problems. These include, but are not limited to, family history of AOD use, age, social group status, and drinking motives. Interventions have evolved to include components that target modifiable risk factors (Hansen et al., 2007) with a focus on reducing alcohol consumption and consequences. Yet, even when interventions have been designed to target alcohol-related consequences, there is still some variation in effect (Borsari et al., 2014). These factors (discussed below) either independently predict, moderate, or partially mediate measures

of alcohol consumption and experience of alcohol-related consequences (Carey et al., 2009, 2016; Doumas, Miller, & Esp, 2017). Understanding these factors may be useful in making risk determinations prior to intervention assignment and also may be appropriate targets for interventions. Some of these identified risk factors are stable, thus not modifiable; whereas, others could be modified or altered, thus may be specifically identified with screening interventions followed by targeted intervention (Hansen et al., 2007). Regardless, interventions can be created to meet the needs of non-modifiable factors (e.g., biological sex, LaBrie et al., 2010; LaBrie, Thompson, Huchting, Lac, & Buckley, 2007) and modifiable factors.

These individual factors are rarely included in intervention studies. Nevertheless, on the few occasions individual factors are included, they are typically identified as potential confounding variables in effectiveness determination (Carey et al., 2009; LaBrie et al., 2010). Regardless, never have these factors been used to consider assignment to sanctioned intervention for AOD policy violations. And though they have been explored as confounding variables, little is known of how these identified factors interact, or play out in a larger model, to predict risk for escalation of use or alcohol-related consequences. Understanding the factors that explain risk among college students may help to explain the effectiveness, or lack of intervention outcomes. It is possible that a better understanding of these factors could help university personnel engage in risk-based assignment to interventions.

Risk Based Assignment and Intervention Effectiveness

There have been recommendations made, or utilized, for quantitative assessments of risk in the past 15 years. In the known literature, there are suggestions for assessment of risk based on scores on the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) or various combinations of frequency of HED and alcohol-related consequences (Bernstein et al., 2017; Borsari & Carey, 2005; Borsari et al., 2012, 2007). It is suggested that AUDIT scores may be used for risk assessment (Cortés Tomás, Giménez Costa, Motos-Sellés, Sancerni Beitia, & Cadaveira Mahía, 2017; Hagman, 2016) to assign appropriate interventions to college students. Carey et al. (2009) utilized AUDIT scores to quantify hazardous drinking and found AUDIT scores demonstrated a main effect on pre-sanction drinking as well as intervention outcomes; and higher risk drinkers (defined as AUDIT scores greater than or equal to 10) demonstrated greater reductions in drinking from pre-sanction to one-month post intervention. AUDIT scores have a demonstrated positive relationship with quantity, frequency, and intensity of drinking, blood alcohol content, age of initiation to alcohol consumption and experience of other alcohol related problems (DeMartini & Carey, 2009). Borsari et al. (2016) found mandated students with higher AUDIT scores were less likely to be identified as low risk drinkers at 6 weeks following Step 1 brief advice (BA). "Low risk drinker" is defined as a combination of less than 4 HED episodes and less than 5 YAACQ experiences in the past 30 days. However, risk level of drinking was not assessed as a mediator of BMI effects (Borsari et al., 2016). By contrast, level of hazardous drinking (AUDIT $\geq$ 10 vs. nonhazardous drinking AUDIT $<$ 10), did not

appear to influence the impact of the BMI on HED or peak consumption post intervention (Carey et al., 2009). While arguments have been made to use measures, such as the AUDIT to determine risk prior to assignment of interventions, neither the AUDIT nor other validated measures are being used regularly for that purpose. The AUDIT is also not being used to assess efficacy or effectiveness of primary or secondary interventions, even in the face of recommendations in the scholarly literature to use it these ways.

While clinicians and researchers have not used measures such as the AUDIT to test efficacy or assign students to interventions, some researchers have used a combination of consumption and consequences measures to identify level or risk in intervention effectiveness studies (Bernstein et al., 2017; Borsari, 2005; Borsari et al., 2012, 2016). Within efficacy trials, Borsari (2005) and his colleagues (2012, 2016) have conducted studies of the effects of interventions based on stepped care. In this approach, each participant completes a bank of assessment instruments followed by a 15-minute brief advice (BA) session delivered by a peer in Step 1 of the intervention. A second bank of assessments is completed 6 weeks after Step 1 and results are used to determine whether a person is assigned to Step 2. Step 2 is implemented for students who demonstrate risk as defined by four or more binge drinking episodes or 5 or more endorsed items on the Young Adult Alcohol Consequences Questionnaire (YAACQ) in the past 6 weeks following the Step 1 BA intervention. Specifically, in this example, Step 2 was a BMI adapted from BASICS and includes personalized feedback about drinking norms, BAC/tolerance, alcohol related consequences, and the influence of environmental factors on drinking and alcohol expectancies based on student's responses

to assessment instruments from baseline to 6 weeks post Step 1 intervention (Borsari et al., 2012, 2016).

Overall, the Step 1 BA demonstrated reductions in alcohol consumption and/or problems for a large number of students, The Step 2 BMI demonstrated effects above and beyond no effect or limited effect of BA as well as positive effects compared to Assessment Only (AO) for higher risk drinkers (Borsari, 2005; Borsari et al., 2012, 2016). For low risk students who engaged in BA only, there was a short-term reduction in HED and alcohol related consequences at 6 weeks with a subsequent increase at 3-, 6-, and 9-month intervals resulting in a return to baseline HED and consequences. The stepped up BMI demonstrated a reduction in alcohol related consequences measured by the YAACQ and a reduction in recidivism compared to the AO group, but there was no impact on alcohol consumption (Borsari et al., 2012). Importantly, there were still students who engaged in the BMI who also experienced subsequent infractions. Students in the BMI were higher risk drinkers in general, and higher risk drinkers had higher recidivism than lower risk drinkers (Borsari et al., 2012, 2016). Similar results were found in a sub-study of phone-delivered BMI vs. AO for Step 2 intervention (Borsari et al., 2014). And, since there was no change in HED, there was no reduction in risks that operate by way of increased drinking quantity or frequency – including some specific types of consequences that may not be fully mitigated by way of the BMI.

A limitation of the above noted studies is that several individual demographic factors that are related to alcohol consumption and alcohol related consequences were not included in risk determination or interpretation of stepped care study results. While

Borsari et al (2012, 2014) collected demographic data, such as age, gender, weight, year in school, race/ethnicity GPA, and age at first drink, they did not consider the majority of these variables as covariates in subsequent analyses, or in understanding why some students remained high risk and exhibited a need for Step 2 while other students were positively impacted by Step 1. Borsari et al. (2012) found that age of onset to consumption (age at first drink) significantly differentiated low-risk (average age of initiation =16.12 years) and high-risk drinkers (15.63 years for BMI and 15.49 for AO). While age of first drink was found to be important in the first study (Borsari et al., 2012), Borsari and colleagues (2014) did not consider it as a covariate, or a tailoring variable for risk determination, in the subsequent study. The other variables collected were solely used for descriptive purposes and not to understand why the intervention was effective for some students and not for others. Furthermore, while Borsari et al. (2012, 2014) did collect some data on individual factors, they failed to assess for drinking motives or family history, both of which have been identified as predictors of alcohol-related problems (Capone & Wood, 2008; Grant et al., 2007) – which was the primary outcome variable reduced as an effect of the BMI in both studies. Additionally, drinking motives and family history have been identified as known predictors of quantity, frequency, or intensity of drinking (Capone & Wood, 2008; Grant et al., 2007).

Borsari et al.'s (2016) results demonstrated different responses to the BMI based on a student's profile of current substance use and attitude toward the incident, however, intrapersonal factors such as one's own attitudes toward drinking, perceptions of drunkenness, and one's own intentions to drink until drunk (Mallett et al., 2009) may

have influenced their response to the incident and thus intervention outcomes. Interestingly, study participants with (a) low levels of alcohol-related problems in the past month, (b) moderate alcohol use at the time of the incident, (c) high levels of responsibility for the incent, and (d) high levels of aversion to the intervention process actually had an increase in HED following the BMI (Borsari et al., 2016). Age of first drink, gender, and other factors were assessed as potential moderators of the effects of BMI, and there was no moderation effect; however, there is no descriptive information to determine if there were differences on these variables between the low and high-risk groups. There was also no consideration of reasons (or motives) for drinking that may have impacted students' level of responsibility for their own behavior or their aversion to the intervention process (e.g. if they were drinking to celebrate a friend's 21st birthday, an athletics win, or to cope with a recent breakup).

Borsari and colleagues (2016) speculated about the reasons for lack of positive response to the sequentially administered BMI and suggest that it may be due to using only alcohol use and problems as tailoring variables and suggest future researchers empirically assess a more multifaceted set of tailoring variables. Suggestions for tailoring variables included circumstances of the alcohol-related event and consequences rather than a simple summary of problems as reflected by the YAACQ sum score (Borsari et al., 2016). This suggestion is consistent with the principles of social ecology and transition theory which suggest that contextual factors contribute to individuals' response to life events (Bronfenbrenner, 1979; Evans, Forney, Guido, Patton, & Renn, 2009). Given this suggestion by Borsari et al. (2016) and the need to consider individual

context, it may be appropriate to include other individual factors such as drinking motives or family history which have been associated with frequency/intensity of drinking as well as alcohol-related problems (Carey et al., 2010; B. F. Grant et al., 2015). Understanding the factors that differentiate low and high-risk drinkers may aid researchers and clinicians in identifying a more holistic model for risk assessment.

Though promising, these studies of stepped care (Borsari, 2005; Borsari et al., 2012, 2016, 2014) were conducted by the same primary investigator and with a research group that had substantial resources. It may be difficult to implement this approach in a setting with less resources as stepped care implementation requires administration and interpretation of results as well as available staff to conduct BA and BMI session. It may be more helpful to better understand each student's individual risks to overall AOD consumption and related consequences prior to assigning an intervention from the outset, rather than waiting to determine if the first level intervention was effective before determining a second level intervention.

Bernstein et al. (2017) sought to account for the administrative challenges of Stepped Care implementation by identifying an alternative calculation of risk assessment and assignment to intervention for mandated students. Mandated students who experienced their first alcohol policy violation at a mid-sized public university in New England were classified as high-risk (5 or more alcohol related problems measured by the YAACQ AND 2 or more heavy drinking episodes in the past month) or low risk (all others). High risk drinkers were assigned to an individual, one-session, BMI and low risk drinkers were assigned to a one-session group BMI. Follow up assessments were

conducted at one-month post intervention (Bernstein et al., 2017). Participants in both the individual and group BMI conditions reported significant reductions in alcohol use and alcohol related consequences overall; however, there were some participants for whom the intervention had no effects or who demonstrated an increase in alcohol consumption and alcohol-related problems (Bernstein et al., 2017).

Though there were reductions overall in consumption and problem measures for both intervention conditions, for some students, there was a transition from being a low-risk drinker to a high-risk drinker from baseline to 30 day follow up (n = 19; 11% of low risk drinkers who completed the 30 day follow up assessment; Bernstein et al., 2017). And, even though most of the high-risk drinkers retained at follow up transitioned to low risk drinking, some (n = 10 of 33) remained in the high-risk group even though students in the higher risk group showed greater reductions in alcohol consumption and alcohol problems overall. The study results demonstrated that a majority of students are lower risk drinkers (82.5%), and, it is feasible to deliver a group BMI to lower risk drinkers and an individual BMI to higher risk drinkers in a setting that has limited resources (Bernstein et al., 2017).

Bernstein et al. (2017) identified limitations of the study such as timing between sanction and intervention, but they fail to discuss the students for whom there were increased in alcohol consumption and alcohol-related problems or who did not transition from high to low risk. Considering what we already know about predictors of risky drinking, it seems prudent to assess and discuss factors known to predict consumption and consequences in the future. Bernstein et al. (2017) included age, gender, race,

ethnicity, and Greek status in demographic questions, but there was no assessment of other factors known to predict risky drinking such as age of onset of use, drinking motives, or other intrapersonal experiences related to alcohol use. Specifically, participants in the study overall were predominantly White (72%), male (55%), and 18 (44%) years old. For the I-BMI (high risk group), participants were more likely to be male (79.2% vs. 58.3% in G-BMI) and Greek (41.7 vs. 25.2%) consistent with males and Greeks drinking more than female or non-Greek college students (Fairlie et al., 2010). Students who were of legal drinking age or older (n = 11 of 313) were not represented in the higher risk I-BMI condition (Bernstein et al., 2017). Thus, it may be that these demographic differences between the low and high-risk groups may account for the differences found on the treatment outcomes.

Social Ecology and Transition Theory

The Ecological Systems (Bronfenbrenner, 1979) theory of human development describes the individual as a developing person who is dynamic, constantly growing and changing, and both influenced by and influencing the environment. Further, Bronfenbrenner described the environment as not a single setting, but the interrelationship between settings (micro-, meso-, exo-, and macro-systems with the individual at the center), and later added the function of time (chronosystem) (Bronfenbrenner, 2005). The ecological model suggests behavior is determined by intrapersonal factors (individual), interpersonal (peer) processes, institutional (organizational) factors, community factors, and public policy (Bronfenbrenner, 1979, 2005; Wertsch & Bronfenbrenner, 2005). McLeroy, Bibeau, Steckler, and Glanz (1988)

utilized the concept of ecological systems theory to develop a social ecological model of health promotion (SEM-HP) which has been used as a foundation for developing comprehensive AOD prevention programs.

The McLeroy et al. (1988) text expanded the context of each of the five levels of analysis offering examples of what might be included in each level of analysis as well as suggestions for interventions or techniques to modify outcomes. Intrapersonal factors are individual attitudes, behavior, developmental history, demographics, self-esteem, self-concept, coping skills, and other factors. Interpersonal factors are interactions with formal and informal social groups and support systems such as friendship networks, biological or chosen families, and work groups. Institutional and organizational factors are the formal and informal rules, regulations, guidelines for operation and participation. Community factors are the relationships between and among organizations, institutions, and other formal or informal groups and networks. Public policy includes community/local, state, and national/federal laws and policies that regulate or support behavior, disease prevention, or health promotion. All levels of the model are at play when it comes to AOD interventions for college students, and individual inter- and intra-personal factors are the primary targets for many interventions (Cronce & Larimer, 2011; Larimer & Cronce, 2002, 2002). In considering the individual needs of college students, it is helpful to consider a theory of development that is frequently applied in university settings.

Schlossberg's Transition Theory of adult development applied in a college setting, as discussed in Evans, Forney, Guido, Patton, and Renn (2009), has two levels of

appraisal. Primary appraisal occurs when a person views an event and concomitant transition as positive, negative, or irrelevant. Secondary appraisal includes four sets of factors that contribute to individual ability to cope with the challenge of transition events. These four factor categories are situation, self, strategies, and supports (or the 4 Ss) and interact to inform a student's response to various life events or nonevents (Evans et al., 2009). The occasion of being cited or charged for an AOD policy violation is one such transition event, and it is important to consider how the individual contextual factors of situation, self, strategies and support impact a student's response to being charged with an AOD policy infraction and being mandated to an AOD intervention.

Situation includes the trigger, timing, role changes, duration, previous experience, other concurrent stressors, and personal assessment of responsibility. Self is the personal and demographic characteristics of a person such as economic status, gender, age, stage of life, ethnicity or culture as well as psychological recourses such as ego development, outlook, self-efficacy, values, spirituality, and resilience. Strategies are coping responses related to ability to modify the situation, control the meaning of the problem, or manage stress in the aftermath of the event. Support includes the types, functions, and measurements of relationships, community ties and the impact of those relationships on the person (Evans et al., 2009; Schlossberg, 2011). Each of these factors, characteristics, and responses map onto the social ecological model within the microsystem, mesosystem and the chronosystem.

Transition Theory suggests the importance of individual, intrapersonal variables influencing response to life events and interventions. For example, students in the

Borsari et al., (2016) study had different responses to a BMI based on their level of personal responsibility for the incident and level of aversiveness to the intervention. Additionally, students who perceive a university alcohol policy as appropriate have different patterns of drinking than students who perceive it as too strict (Buettner et al., 2010). So, students' alcohol consumption, experience of consequences, response to AOD policy violation charges and interventions are related to individual factors as well as environmental factors and institutional policy and procedures. A focus on individual variables is supported by a review of the literature (Baer, 2002). Individual interventions have been designed to enhance protective behavioral strategies and provide support (treatment/intervention) for students. They may not, however, always consider the individual psychological or intrapersonal factors that influence student perception of the situation or their response to it. It is important for psychosocial variables such as historical and familial experiences with drinking and cognitive factors such as drinking motives be considered as they may frame students' responses to policy, to allegations of policy violation as well as to mandated interventions.

An overarching goal of the ecological perspective is to broaden our approach to health promotion to consider how environmental interventions may support the individual in the behavior change process. This fosters a community of collaboration and increased investment in the change process for everyone – which may result in increased self-efficacy or perceived behavioral control for the individual. As discussed above, this social ecological model has been used for alcohol and drug-related programming. Notably, the model was modified specifically for use with college athletes to address the

context and culture-specific needs of this population (Williams Jr. et al., 2006). So, Schlossberg's Transition Theory of development and the principles of social ecology interact with each other to help to explain individual's responses to life events. The individual and contextual nature of student's experiences and responses leads to the necessity of understanding risk and identifying which contextual factors influence intervention effectiveness and may efficiently be utilized to determine risk-based assignment.

Risk assessment and intervention tailoring variables need to be more individually focused. After considering the literature about intervention assignment and efficacy, there is a clear need for improvement current risk assessment and future intervention assignment practices. This would include better understanding how individual characteristics and factors, along with motives for using alcohol and other drugs, interplay and relate to overall risk among college students. While we understand how individual factors relate, such as males drink more or students who are members of social groups drink at higher rates, a larger more holistic model has not yet been explored to find the factors that are most influential in explaining overall risk.

There is also a need for the study of the impact of assignment practices on intervention outcomes. For college students in transition and in an environment where comprehensive prevention programs are prominent, it seems that a focus on the individual and their intrapersonal factors related to the target behavior (substance use) is appropriate. Understanding the person at the individual level can only occur through comprehensive assessment including psychosocial history, drinking motives, and other

intrapersonal factors that may be related to substance use outcomes. However, before we can better understand the impact of assignment practices, we first need to understand the factors that should be used in making assignments to interventions. And, though it is important to understand this in the context of alcohol and other drugs, only measures of alcohol use are included in this study.

Individual Factors Associated with Alcohol Consumption and Related Problems

Some common predictors of alcohol consumption and/or alcohol-related problems are age of initiation to alcohol use (Buettner et al., 2010; Scaglione et al., 2015), family history of alcohol use (Capone & Wood, 2008; Carey et al., 2010; Weitzman et al., 2003), biological sex (Carey et al., 2010; Merrill, Carey, et al., 2014; Merrill, Wardell, et al., 2014; Yusko et al., 2008b), race/ethnicity (Logan, Kilmer, King, & Larimer, 2015; Weitzman et al., 2003), housing status/living environment (Weitzman et al., 2003), social group membership (Fairlie et al., 2010; Weitzman et al., 2003), current age or class year (Doumas et al., 2006; Logan, Lewis, Mastroleo, Kilmer, & Larimer, 2015; Wyrick et al., 2016), current or recent drinking, and other intrapersonal (Mallett et al., 2009) or cognitive factors such as drinking motives (V. V. Grant et al., 2007; Merrill, Wardell, et al., 2014; Wahesh, Milroy, Lewis, Orsini, & Wyrick, 2013). A brief discussion of the selected inter- and intra-personal factors related to alcohol consumption, alcohol related consequences, and other alcohol-related risk is included below.

Age of Onset

Age of onset or initiation to alcohol use has a demonstrated relationship with drinking quantity, frequency, and alcohol related problems. Collegiate heavy drinkers

with early age of onset (prior to age 11) for alcohol use have more consequences related to alcohol use than those with a late (older than 19) age of onset of alcohol use (Buettner et al., 2010). Weitzman, Nelson, and Wechsler (2003) suggested "Students who began recreationally drinking and/or who reported being drunk before age 16 years were more likely to pick up binge drinking in college than were their peers who reported drinking and getting drunk later in adolescence" (p. 29). Having an onset of drinking before age 16 resulted in college students who were 10 times more likely to experience multiple repeated consequences than their peers (Scaglione et al., 2015).

Family History

Early experiences with alcohol in the formative environment are related to alcohol use and alcohol-related outcomes. More specifically, college students who have a family history positive for alcohol use tend to consume at higher rates than their peers without family history of drinking. Weitzman, Ying-Yeh Chen, & Subramanian, (2005) found students who grew up in homes with parents who drank were more likely to initiate binge drinking in college than students whose parents disapproved of drinking. Similarly, male and female students who met the AUDIT-C criteria for hazardous drinking were more likely to have a family history positive for alcohol use than students who did not meet the hazardous drinking criteria (Wahesh & Lewis, 2015). For students mandated to interventions for alcohol policy violations, students with a positive family history for alcohol use consumed more drinks per week and more drinks on a typical drinking day than mandated students with no family history for alcohol use (Carey & DeMartini, 2010). And, males with positive family history reported consuming more drinks on the

day of the sanctioned intervention than males with no family history (Carey & DeMartini, 2010). By contrast, Capone and Wood (2008) found positive family history had no association with higher risk drinking in terms of quantity and frequency of use, but family history of use was related to increased experience of alcohol related consequences among college students.

Borsari and Carey's (2005) study of alcohol intervention for mandated college students noted their intervention was ineffective for some students. They suggested that one reason for this lack of effectiveness was the lack of consideration of historical and maturational factors, including family history, that may have contributed to the lack of reductions in alcohol use over the course of their intervention study. By including family history, which is known to be related to attitudes about use, current alcohol consumption, and risk for problem development; researchers and clinicians can gain a more comprehensive picture of an individual's contextual factors that may impact their pattern of drinking and perhaps their response to interventions.

Biological Sex

Males tend drink at higher rates than females (Caamaño-Isorna F et al., 2017; Carey & DeMartini, 2010; Merrill, Wardell, et al., 2014; Sheppard, Usdan, Higginbotham, & Cremeens-Matthews, 2016; Yusko et al., 2008b). Males were also more likely to report drinking on the date of the policy violation than females (66% vs. 34%; Carey & DeMartini, 2010), and males were more likely to engage in HED than female students (Yusko et al., 2008b). In addition to having a higher rate of consumption, collegiate men experience higher levels of alcohol-related consequences

and academic/occupational problems than women (Merrill, Wardell, et al., 2014). Specifically, males experienced negative consequences more frequently than women but there was no difference in experience of positive consequences related to alcohol use (Park & Grant, 2005).

Race/Ethnicity

When considering racial/ethnic differences, White/non-Hispanic students are more likely to consume alcohol in general and at risky rates. Specifically, Yusko et al. (2008) found what White students were more likely to engage in HED than non-White students. And, White students are more likely to initiate binge drinking in college than non-White students (Weitzman, Nelson, & Wechsler, 2003). However, White students represent the majority (76%-97%) of study participants in effectiveness studies for mandated interventions (Borsari et al., 2012; Carey et al., 2009; LaBrie, Cail, Pedersen, & Migliuri, 2011; Logan, Kilmer, et al., 2015), studies of alcohol-related consequences (80% to 88% of participants; Read et al., 2006), and studies the relationships between drinking motives and consequences (Merrill, Carey, et al., 2014; Merrill & Read, 2010). For this reason, authors cite the high representation of White/non-Hispanic students as a reason for lack of generalizability of most research results. Thus, while it is noted that White/non-Hispanic students are more likely to consume alcohol and have a greater likelihood of engaging in HED and having alcohol-related consequences, there is limited information about risk assessment and intervention outcomes for non-White students.

Exploring the impact of race and ethnicity is important as non-White students may demonstrate different patterns of alcohol consumption than White students. To

address the limitation in many alcohol studies of including primarily White students, Edwards et al. (2015) administered the 2014 Core Alcohol and Drug Survey to 2258 Black American undergraduate students aged 18-53 (average age of 20.09; 65.2% female) at seven Historically Black Colleges/Universities (HBCUs) in the Southeastern United States to understand the relationship between institutional programs and binge drinking in Black American students. The rate of binge drinking, using gender specific criteria, within their sample was only 5.8%, which is lower than the reported rate of binge drinking in studies that have predominantly White/non-Hispanic students in the sample (e.g. 42% in the last two weeks; in Eshbaugh, (2008). Using linear regression, Edwards et al. (2015) also assessed the relationship between demographic variables and alcohol consumption. In contrast to studies that include predominately White college students, neither age, class year, nor marital status were significant predictors; however, similar to other studies, identifying as male predicted a higher number or drinks consumed per week compared to students who identified as female. In another study that explored the impact of race and ethnicity on alcohol-related outcomes, Mallett et al. (2009) found no differences in patterns of drinking between White and non-White students in their voluntary sample (48% White, 43% Asian/Asian American). And, in a study of Hispanic students by Venegas, Cooper, Naylor, Hanson, and Blow, (2012), almost half (47.5%) of their sample reported engaging in HED in the past 90 days, with 51% of males reporting HED compared to 44% of women. So, it seems there are different patterns of alcohol consumption among racial/ethnic groups, which may also indicate different patterns of

alcohol related consequences or drinking motives as some of these operate by way of increased consumption.

While a few researchers, as noted above, focused or included a sample of non-White students, research about alcohol use in college students is lacking diversity. This lack of diversity in samples may be due to lack of diversity in the institutions where the samples are drawn. Regardless of the reason, the lack of racial diversity in research samples impacts the generalizability of research results. There is not enough information about patterns of drinking among non-White college students to fully understand differences in patterns of use and consequences. So, at minimum, it seems important in this and future studies to recruit more diverse participants, and it is also important to assess the influence of race and ethnicity on AOD consumption and related consequences.

Current Age/Class Year

Students who are in their first or second year of undergraduate study or who are under age 21 have different patterns of alcohol consumption and consequences. When they consume alcohol, they are more likely to engage in heavy episode drinking (HED), and they are more likely to experience alcohol related problems in the collegiate environment than upperclassman or older students (Merrill, Wardell, et al., 2014; Wechsler, Lee, & Nelson, 2002). Wechsler, Lee, and Nelson, (2002) used data from the 2001 College Alcohol Survey of undergraduate students from 120 accredited 4-year college in 38 states and DC to understand the relationship between deterrence policies and underage alcohol use. Participants were separated into the underage group (<21),

and the reference group 21-23 to compare rates of drinking and experience of consequences. Almost half (43.6%) of students across both groups were classified as binge drinkers, using gender-specific criteria. However, underage students were less likely to drink in each of the reference periods than of-age students. Yet, when underage students did consume alcohol, they reported being drunk on more occasions in the past 30 days than of-age students and were more likely to report drinking to get drunk as an important reason for alcohol consumption compared to 21-23-year-old students. Additionally, underage students were more likely to report serious consequences related to their alcohol use such as getting into trouble with the police or getting hurt or injured than their peers in the 21to 23-year-old age group. The higher frequency of experiencing AOD consequences among first year college students is also evident among highly social groups such as athletes. First year NCAA Division I athletes are more likely to report sport-related problems associated with drinking than NCAA Division II or III athletes (Wyrick et al., 2016). While underage students tended to get drunk more often and experience more consequences, they were less likely to report driving after consuming alcohol, missing classes or engaging in unprotected sexual activity as result of their alcohol use (Wechsler, Lee, & Nelson, 2002).

However, it should be noted that in studies of interventions for college students with risky drinking patterns, first year college students and students under the age of 21 years old (potentially second year/sophomore) are over represented (Logan, Lewis, et al., 2015; Morgan, White, & Eun Young Mun, 2008). As examples, Borsari et al.'s, (2016) study of stepped care interventions included 68% freshman, with a mean age of 18.68. A

study of a group BMI for mandated male students included 56% freshman/first year students and 35% sophomore/second year students (LaBrie et al., 2011). And, in Carey et al.'s (2009) study of computer based interventions versus an in-person BMI for mandated students, 85% of participants were underclassmen (56% freshman, 29% sophomores). This pattern of underclass or underage students may be related to the fact that first and second year students are more likely to engage in problematic drinking behaviors than their peers (CORE, 2013; Merrill, Wardell, et al., 2014) or violations may be more likely to occur given the specific policy requirements related to illegal AOD activity (such as drinking under the age of 21 years.). Yet it may also be that these populations are simply overrepresented in intervention studies, or generally more frequently referred to interventions on university campuses when compared to their upperclassman peers.

Living Environment

Students who live on campus are more likely to engage in heavy drinking, pick up binge drinking, and experience alcohol-related problems than students who live at home with their parents (Wechsler, Lee, & Nelson, 2002; Weitzman et al., 2003)As expected, students in substance-free on campus housing are less likely to consume substances or experience substance related problems than students who live in traditional campus housing or Greek-Specific housing (Boyd, McCabe, & d'Arcy, 2004) though there continues to be an alarming frequency of use even among students living in substance free housing when compared to students living at home with parents. Results of the Harvard College Alcohol Study conclude that students who lived in controlled settings

(such as off campus with parents) were less likely to report binge drinking, while students in less controlled settings (e.g., Greek housing) were more likely to binge drink than students with other residence types.

Social Group Membership

Members of highly social groups, like social sororities and fraternities or athletes, are more likely to consume alcohol than their less social peers (Fairlie et al., 2010; Yusko, Buckman, White, & Pandina, 2008a). In a study of the predictors of alcohol consumption in college students, Sheppard, Usdan, Higginbotham, and Cremeens-Matthews, (2016) found Greek involvement predicted average number of drinks consumed per week and students who were involved in Greek activities (organization members and those who frequently participated in Greek activities) consumed alcohol at a higher rate than students with no Greek involvement. Increased alcohol use for students in highly social groups may be related to cultural expectations of the group (conformity motives) or perceived behavioral norms. Regardless of reason, social group membership needs to be explored as a potential risk factor in the larger model of alcohol consumption and overall risk.

Drinking Intentions

In addition to various demographics and group memberships, internal processes also influence alcohol related outcomes. Mallett et al. (2009) examined the unique impact of various intrapersonal (one's own level of intoxication, attitudes or beliefs about drinking, and drinking intentions) and interpersonal drinking perceptions on alcohol consumption in a typical week, a typical weekend, and on peak drinking in the last 90

days in college students. Intentions to drink were measured in response to "In general, when I drink, I intend to get drunk." Each of the intrapersonal variables predicted average alcohol consumption on the weekends and during peak drinking occasions, and two of the intrapersonal variables (drinking intentions, and perceptions of drunkenness) were also related to alcohol consumption in a typical week. Race/ethnicity did not impact the findings (Mallett et al., 2009).

Consumption and Consequences

Standardized measures of alcohol consumption are related to hazardous or harmful drinking and alcohol-related problems. Intervention studies demonstrate that alcohol use at the time of assessment may be a factor in intervention efficacy. In a study of mandated students, participants with higher AUDIT scores (10 or more) were more likely to report higher level of drinking prior to a policy violation event and to report greater reductions in drinking in terms of typical drinks per week and heavy drinking frequency) as well as alcohol related problems (measured by RAPI scores) between intervention in one-month follow up (Carey et al., 2009). These participants also reported drinking more in the month prior to the sanction than students with lower scores on the AUDIT (Carey et al., 2009). DeMartini and Carey (2012) found that participants who demonstrated high risk rating (hazardous drinking with AUDIT scores greater than or equal to 8), reported higher levels of alcohol consumption and more experiences of alcohol related problems as well as problems with sleep and lower overall health ratings than participants who were nonhazardous drinkers. Study participants with high risk/hazardous drinking status had an average of about 2 binge drinking episodes per

week and reported experiencing at least 7 alcohol related problems (BYAACQ) in the past month. Current alcohol use was measured in the study of the relationship between drinking motives and alcohol related consequences and was identified as a mediator of the relationship between enhancement motives and alcohol consequences such that enhancement motives predicted consequences only by way of increased concurrent drinking by (Merrill, Wardell, et al., 2014). Additionally, descriptive norms of alcohol related problems predicted number of rinks per week (Sheppard et al., 2016).

Drinking Motives

Drinking motives are the reasons why a person consumes alcohol and are related to quantity/frequency of alcohol use as well as alcohol-related consequences. Drinking motives is a comprehensive construct divided into five categories (Grant et al., 2007) based on the most recent iteration of the Drinking Motives Questionnaire (Cooper, 1994; Cooper et al., 1992). These motive types may be internal or external and for positive or negative reinforcement, and are classified as conformity, enhancement, social, coping-anxiety, and coping-depression. Conformity motives (external, negative reinforcement) are drinking due to social pressure or to fit in. Enhancement motives (internal, positive reinforcement) for drinking are when a person drinks to maintain or amplify a positive affectional experience. Social motives (external, positive reinforcement) are drinking to improve experience at parties or gatherings. Coping motives (internal, negative reinforcement) are drinking to avoid or to dull negative affect (anxiety or depression). Different patterns of alcohol use and alcohol related problems are associated with each of the identified motive types in American and international samples (V. V. Grant et al.,

2007; Merrill & Read, 2010; Merrill, Wardell, et al., 2014; Mezquita, Stewart, Kuntsche, & V Grant, 2016) as well as with student athletes (Martens, Watson, Royland, & Beck, 2005).

In their validation study of the five-factor model of drinking motives with undergraduate students, Grant et al. (2007) reported that undergraduate men were more likely to endorse social motives than undergraduate women; however, there were no differences in rates of endorsement on other motive types. The five-factor drinking motives model has also been validated cross-nationally, demonstrating no variance between countries and demonstrates a pattern similar to other studies – with social motives being the most frequent, followed by enhancement, coping-anxiety, coping-depression, and conformity motives (Mezquita et al., 2016).

Risky drinking motives. While social motives are most often endorsed, Grant et al. (2007) identified the *risky* drinking motives as enhancement motives, coping-depression motives, and coping anxiety motives. Enhancement motives were predictive of higher alcohol consumption. Coping-depression motives were predictive of increased alcohol related problems likely because they were also related to higher quantities of alcohol consumption. Similarly, Capron and Schmidt (2012) found a positive relationship between Modified Drinking Motives Questionnaire-Revised (MDMQ-R)enhancement motives and AUDIT scores and average drinks per month in a sample of heavy/hazardous drinking (AUDIT greater than or equal to 8, $M = 12.83$) undergraduate students. Grant et al. (2007) suggested that with further research on clinical utility, the MDMQ-R may be used as a screening instrument to identify undergraduate students with

risky motives for targeted intervention, and coping motives may be treated with appropriate interventions for alternative relaxation or affective coping strategies.

Some motive types are predictive of alcohol-related consequences. While not classified by the authors as a *risky* drinking motive, coping-anxiety motives were predictive of increased experience of alcohol-related problems even when alcohol consumption was controlled (Grant et al., 2007). Additionally, within the same study, students with coping-anxiety motives drank less than students with other motive types (Grant et al., 2007). Thus, given their direct relationship to alcohol-related consequences, it is possible that coping-anxiety motives may be a greater indicator of risk than conformity or social motives.

Motives and consequences. Researchers (Merrill & Read, 2010; Merrill, Wardell, et al., 2014) have tested relationships between scores on the subscales of the four factor Drinking Motives Questionnaire (DMQ-R) (Cooper, 1994) and eight types of alcohol-related consequences on the Young Adult Alcohol Consequences Questionnaire (Read et al., 2006). The four factors of drinking motives (compared to 5-factors) combines coping anxiety and coping depression motives into one overall coping motives scale. The eight sub-scales on the YAACQ reflective of types of alcohol consequences are social/interpersonal, academic/occupational, risky behavior, impaired control, poor selfcare, diminished self-perception, black out drinking and physiological dependence (Read et al., 2006).

Coping motives have demonstrated relationships with different types of negative consequences. While Merrill, Wardell, et al. (2014) found a direct relationship between

coping motives and consequences related to poor self-care, risky behaviors, academic or occupational problems, impaired control, and physiological dependence and no direct or mediating relationship with alcohol consumption, Merrill and Read (2010) found inconsistent relationships between coping motives and various problem types. This may have been due to use of the DMQ-R coping motives subscale combining anxiety and depression together rather than the MDMQ-R coping subscales which separates coping for depression and coping for anxiety motives. Even so, there was evidence to support the idea that undergraduate students who drink to cope with negative affectional experiences experience a broad range of alcohol-related problems (Merrill & Read, 2010).

Enhancement motives may also represent a unique pattern of consumption and consequences. Although there was an indirect relationship between enhancement motives and consequences by way of increased alcohol consumption, there was not a clear pattern of consequences specific to this type of drinking motive (Merrill, Wardell, et al., 2014). Merrill and Read (2010), however, found a significant relationship on the path from enhancement motives to consequences associated with black-out drinking.

The "non-risky" motives types were also evaluated for their relationship with negative alcohol-related consequences. Conformity motives were unrelated to alcohol consumption but were directly associated to consequences on the YAACQ, specifically impaired control, poor self-care, and diminished self-perception subscales (Merrill & Read, 2010). No relationships between social motives and consumption or consequences were found (Merrill & Read, 2010).

Accordingly, it seems important to assess drinking motives in order to fully understand a person's pattern of use in terms of quantity/frequency and alcohol related consequences. In addition to helping us understand patterns of use, assessing motives may aid in development and personalization of interventions. Merrill, Wardell, et al. (2014) suggested that interventions be specific to motives for use such that for students with higher coping motives, perhaps cognitive behavioral interventions are more salient, and for students with higher enhancement motives, perhaps a focus on concurrent drinking quantity/frequency measures in the intervention is necessary or helpful. This suggestion is consistent with the argument that individual factors related to alcohol use need to be fully assessed and may be useful in determining risk and screening students prior to intervention assignment.

Assessing for Individual Factors

As discussed above**,** there are many interpersonal and intrapersonal (individual) factors associated with alcohol related outcomes. The aforementioned factors related to alcohol use and alcohol-related consequences may be useful for targeting risk assessment and/or for intervention targets. Age of initiation to drinking and drunkenness have been identified as predictors of alcohol consumption and alcohol related problems (Scaglione et al., 2015; Weitzman et al., 2003). Biological sex, living environment, and social group membership are also predictive factors for alcohol related outcomes (Weitzman et al., 2003). Current drinking and other intrapersonal factors (Mallett et al., 2009) including cognitive factors such as drinking motives (V. V. Grant et al., 2007; Merrill, Wardell, et al., 2014; Wahesh et al., 2013) predict alcohol consumption quantity, frequency, intensity

and alcohol related problems. Some of these factors that predict, mediate, or moderate alcohol-related outcomes are targeted in interventions for mandated students or are considered as covariates in efficacy or effectiveness studies with the exception of drinking motives which is only included in a few outcome studies (see for example (Doumas, 2017b). However, this is not true for all studies (e.g. Bernstein et al., 2017; LaBrie et al., 2007).

Despite knowledge of the impact of various risk factors on alcohol consumption, alcohol-related consequences, and risk for escalation of use or increased problems, there is no known documentation in the scholarly literature of these interpersonal and intrapersonal factors being used to determine risk ratings prior to intervention assignment. Furthermore, although these factors are known to be associated with alcohol consumption and alcohol related consequences, there are no known studies that include all of the identified individual factors in the same model to explain current alcohol or drug related behaviors or risk for problem development or escalation. Additionally, these factors are not being assessed and utilized to identify risky patterns of drinking prior to intervention assignment. Thus, it is necessary to understand how individual demographic, psychosocial, and cognitive factors work together to predict risk for problem escalation and if there are sets of variables that predict risk as defined by previous researchers.

CHAPTER III

METHODOLOGY

Chapter 1 presented a brief overview of the study and research questions designed to examine the role of demographic and intrapersonal factors at predicting risky patterns of alcohol use. Chapter 2 presented a review of the relevant literature pointing to a lack of empirical assessment of contextual factors that lead to risk drinking in college students. The current chapter presents methodology and proposed analysis to address that deficit in scholarly work.

Research Questions and Hypotheses

Below (and in Table 3.3) are the research questions, with the associated hypotheses, for this study. Note that some research questions do not have specific hypotheses given the exploratory nature. Thus, research questions examining the parsimonious models are exploratory in nature.

Research Question 1A: Which set of variables predict hazardous drinking? [stepwise logistic regression]

Hypothesis 1A: coping-depression motives, coping-anxiety motives, and age of initiation to alcohol use will be related to hazardous drinking.

Research Question 1B: Which set of individual factors are included in the most parsimonious model for identification of students with hazardous drinking patterns? [stepwise logistic regression with backward elimination]

Research Question 2A: Which set of variables predict high and low risk patterns of alcohol use as defined by frequency of HED and sum of YAACQ experiences drinking in the last 30 days? [stepwise logistic regression]

Hypothesis 2A: Coping-depression motives, coping-anxiety motives, and age of initiation to alcohol use will be related to high risk patterns of drinking in the last 30 days.

Research Question 2B: Which set of variables is the most parsimonious for identifying students with high vs. low risk patterns of alcohol use as defined by of frequency of HED and sum of YAACQ experiences in the past 30 days? [stepwise logistic regression with backward elimination]

Research Question 3: What are the differences between the models identified in RQ1A, RQ1B, and RQ2? [visual inspection of model differences]

Method

Participants

Participants were recruited from a mid-sized public university in the southeastern United States. To be included in the study, participants must be at least 18 years old and not have reached their 26th birthday. Participants must have been students enrolled in an undergraduate degree program at least half time (6 credit hours) in the current semester (Spring 2019).

A minimum sample size of 157 participants was sought, based on an a priori power analysis. *G*Power* suggested 157 participants based on a moderate effect size, alpha set to .05, and power set at .80 for 20 predictors. Utilizing another method to calculate sample size to answer questions with stepwise regression, it was recommended

to have at least 10 participants for each candidate variable (Peduzzi, Concato, Feinstein, & Holford, 1995); yet other researchers suggested two observations per variable may be sufficient (Austin & Steyerberg, 2015; Vittinghoff & McCulloch, 2006). Using this calculation method, with 20 candidate variables, between 40 and 200 participants would be needed. Therefore, a sample size of 157 was the minimum number of participants for the current study although a larger sample size was sought.

Measures

Instruments used in this study included the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), the Young Adult Alcohol Consequences Questionnaire (YAACQ; Read, Kahler, Strong, & Colder, 2006), the Modified Drinking Motives Questionnaire-Revised (MDMQ-R; Grant, Stewart, O'Connor, Blackwell, & Conrod, 2007), two sex-specific items to measure frequency of heavy episodic drinking in the last 30 days, and a demographics questionnaire. Table 3.1 identifies variables for standardized measures. Table 3.2 includes demographic constructs. A brief description of each measure follows.

Table 3.1 Measures and Constructs

Measure	Variable/Construct	Variable Type
AUDIT	Hazardous drinking/nonhazardous drinking	Dichotomous
Young Adult Alcohol Consequences Questionnaire (YAACQ)	alcohol-related consequences	Continuous

Modified Drinking Motives Questionnaire-Revised (MDMQ-R)	Social motives Conformity motives Enhancement motives Coping-depression motives Coping-anxiety motives	Continuous
Q: How many times in the last month (30 days) have you consumed FOUR (4) or more drinks in one sitting? (females)	frequency of heavy episodic drinking	Continuous
Q: How many times in the last month (30 days) have you consumed FIVE (5) or more drinks in one sitting? (males)	frequency of heavy episodic drinking	Continuous
Frequency of HED + YAACQ Sum Score	High/Low Risk	Dichotomous

Alcohol Use Disorders Identification Test. Hazardous drinking was measured by the Alcohol Use Disorders Test (AUDIT) and defined as a score of 8 or more. The AUDIT is a 10-item measure with three subscales for consumption, consequences, and alcohol related problems. The questions ask participants to report the frequency of various alcohol related behaviors on a 5-point Likert Scale (scale (0 = *Never*, 1 = *Less Than Monthly*, 2 = *Monthly*, 3 = *Weekly*, 4 = *Daily or Almost Daily*) and quantity of alcohol consumption over the past year. Each item is scored 0 to 4, and scores are summed to achieve a total score of 0 to 40 with higher scores indicating increased likelihood of hazardous or harmful dinking and greater risk for future alcohol use disorder. For this study, the dichotomous variable of hazardous drinking versus nonhazardous drinking was used.

The AUDIT was validated on clinical populations (Saunders et al., 1993). A cutoff score of 8 predicted hazardous drinking and demonstrated average sensitivity of .92 and average specificity of .94 in cross-national samples (Australia, Bulgaria, Kenya, Mexico, Norway) (Saunders et al., 1993). The instrument has also been validated with collegiate populations, with over half of students scored an 8 or higher on the AUDIT. Eight is the cutoff score for defining hazardous drinking in the current study. Nonhazardous drinking is a score of 7 or less.

Heavy episodic drinking. Based on previous research (Borsari & Carey, 2000; Wechsler, Lee, Kuo, et al., 2002), frequency of heavy episodic drinking (HED) was measured with two items, one for each biological sex. For females, "how many times in the last month (30 days) have you consumed FOUR (4) or more drinks in one sitting," and for males "how many times in the last month (30 days) have you consumed FIVE (5) or more drinks in one sitting?"

Young Adult Alcohol Consequences Questionnaire. Alcohol related consequences were measured with the Young Adult Alcohol Consequences Questionnaire (YAACQ; Read et al., 2006). The YAACQ is a 48-item measure scored with dichotomous yes/no responses on each item within the specified time frame, typically 30 days or one year. For the purpose of this study, the designated time frame was 30 days. Example items include "I have become very rude, obnoxious or insulting after drinking" and "I have felt badly about myself because of my drinking." Scores on the YAACQ load on to 8 subscales: social /interpersonal, academic/occupational, risky behavior, impaired control, poor self-care, diminished self-perception, blackout drinking,

and physiological dependence, as well as the sum score which is the primary measure of overall experience of alcohol related consequences.

The YAACQ items and scores have been found to be reliable and valid (Read et al., 2006). The average YAACQ total sum score in the validation sample was 14.7 Factor loadings for each subscale ranged from .48 to .92. Scores on the YAACQ were significantly positively correlated with scores on other measures of alcohol problems as well as measures of alcohol consumption and negatively correlated with grade point average, and results of psychometric analysis demonstrated gender invariance (Read et al., 2006). Cronbach's alpha for total scores ranged from .79 to .86, and .74 to .95 for each of the eight subscales, and Pearson *r* for test-retest reliability was .86 for the sum score and .45 to .85 for each of the subscales, so the instrument demonstrates strong internal consistency, strong test-retest reliability for total scores, good re-test reliability for subscale scores, and good concurrent and predictive validity (Read, Merrill, Kahler, & Strong, 2007). For the purpose of this study, the sum score of the YAACQ was used.

Modified Drinking Motives Questionnaire Revised. Drinking motives were measured by The Modified Drinking Motives Questionnaire-Revised (MDMQ-R), a 28-item instrument designed to measure five motives for alcohol use: conformity, enhancement, social, coping-anxiety, and coping-depression. The Drinking Motives Questionnaire (Cooper, Russell, Skinner, & Windle, 1992) was developed based on the motivational model of alcohol use (Cox & Klinger, 1988), and had three factors coping (drinking to avoid or dull negative affect), enhancement (drinking to maintain or amplify positive affect) and social (drinking to improve parties or gatherings) motives. The

measure was expanded in 1994 to include conformity motives (Cooper, 1994). Social motives were determined to be the most frequently endorsed reasons for drinking. Each of the four motive types was found to be associated with a particular pattern of concurrent alcohol use and alcohol-related problems when demographic differences were accounted for (Cooper, 1994). The measure was further modified in 2013 in a dissertation study (Blackwell & Conrod, 2003) and later validated by V. V. Grant et al. (2007) to confirm the five-factor model used in the current study.

The MDMQ-R has five subscales with multiple items used to assess motives: coping depression (9 items), coping-anxiety (5 items), enhancement (5 items) conformity (5 items), and social motives (5 items). Items are formatted consistently throughout with participants responding on a 5 point Likert-type scale (1= "never/almost never" to 5 "always/almost always") with the instructions: "Taking into consideration all the items you drink, how often do you drink (…..)". Subscale scores are determined by averaging the sum score of items with higher scores represented greater endorsement of alcohol consumption for that reason. Each of the subscales has demonstrated internal consistency coping-depression (.66-.94), coping-anxiety (.69-.73), enhancement (.83-.85), social (.61-.69), and conformity (.72-.91) and good test-retest reliability (V. V. Grant et al., 2007). The MDMQ-R is also valid cross-culturally (Mezquita et al., 2016). All five subscales will be used in the current study.

High and low risk drinking. Bernstein et al. (2017) defined high risk drinking as two or more episodes of HED *and* affirmative response to 5 or more items on the YAACQ in the last 30 days. All other scores are considered to equate low risk patterns

of alcohol use. Therefore, a dichotomous variable of high versus low risk will be calculated for this study based on Bernstein et al.'s definition.

Demographics. Demographic data were collected from students including age, biological sex, race, class/year in school, grade point average (GPA), housing status, athlete status, and Greek status. Psychosocial history information including age of initiation to alcohol use and drunkenness, family history of alcoholism, treatment history, and experience of being charged with/cited for a university AOD policy violations were also collected. Items used to assess demographics are listed in Table 3.2 and were chosen based on their association with alcohol consumption, drinking motives, and/or alcohol-related consequences in previous research.

Table 3.2 Demographic Constructs

Measure	**Variable/Construct**	**Variable Type**
What is your age (in years) as of today?	Age	Continuous
What is your biological sex?	Biological Sex	Dichotomous
How do you describe your race? (check all that apply) Do you identify as Hispanic?	Race	Categorical
What is your class year?	Class/Year in School	Categorical
What is your approximate cumulative GPA?	grade point average (GPA)	Continuous
What is your housing status? (Where are you living this semester?)	Housing Status	Categorical - Dichotomous
Have you participated in organized collegiate athletics in the past year?	Athlete Status	Categorical - Dichotomous

Are you a member of a social fraternity or social sorority? This includes social Greek letter organizations in NPHC, NPC, IFC, NMGC, etc. It does not include strictly service or academic organizations.	Greek Status	Categorical - Dichotomous
Have you lived in a home where others (parents, siblings, other family members or people who lived in or frequented the home) used alcohol or drugs on a regular basis?	Family History	Categorical - Dichotomous
In your opinion, have any of your biological relatives **consumed alcohol** in a way that you would describe as problematic or alcoholic?	Family History	Categorical - Dichotomous
In your opinion, have any of your biological relatives used **drugs** in a way that you would describe as problematic or addicted?	Family History	Categorical - Dichotomous
How old were you (in years) when you FIRST CONSUMED an alcoholic beverage? (Do not count sips such as a bris or your first communion).	Age of Onset/Initiation to consumption	Continuous
How old were you (in years) the first time you got drunk?	Age of initiation to drunkenness	Continuous
I have been cited by the policy or other campus authorities for alcohol use. "Within the last year, have you been cited for alcohol use by university staff or personnel?" (Wahesh, 2013)	AOD Policy Violation History (Violation History)	Categorical - Dichotomous

Procedures

Convenience sampling was used to identify study participants. The sample was drawn from The University of North Carolina at Greensboro. Contact information and demographic information was requested from the Office of Institutional Research for undergraduate students enrolled at least full time in the Spring 2019 semester. An email

containing recruitment information and a link to the web-based study survey was sent to potential participants (see Appendix A). A reminder email was sent about one week after the initial email.

The web-based study survey was designed to take 15-20 minutes to complete. At the conclusion of the study survey, participants were automatically rerouted to another survey link to enter a drawing for incentives. Participants were offered an opportunity to win one of one hundred $5 Starbucks gift cards.

It was deemed that a minimum of 5,000 students needed to be sampled to achieve the minimum of 157 final participants. About 30% of students at the study location responding to a national survey indicated they have never used alcohol, and approximately 48% reported having consumed alcohol in the last 30 days (NCHA/ACHA, 2016). Combined with an average 10% to 15% response rate to online surveys from college students (Bolin, Pate, & McClintock, 2017; Pedersen & Pithey, 2018) and a 32% usability of responses (Peralta & Barr, 2017), this necessitated inviting a minimum of 5,000 students to participate in the study to ensure a minimum of 157 undergraduate college students who have had a minimum of 1 drink within the past year. The goal, however, was to secure a larger final sample, thus, the entirety of the undergraduate population at the study institution is recruited (N = about 18,000). The study information sheet and complete study questionnaire are presented in Appendices B and C.

Data Analysis Plan

Table 3.3 Research Questions

Research Question	Independent Variables	Dependent Variable	Planned Analysis
RQ1A**:** Which set of variables predict hazardous drinking?	Demographics, Drinking Motives	AUDIT Scores	stepwise logistic regression
RQ1B: Which set of individual factors are included in the most parsimonious model for identification of students with hazardous drinking?	Demographics, Drinking Motives	AUDIT Scores	stepwise logistic regression with backward elimination
RQ2A**:** Which set of variables predict high and low risk patterns of alcohol use as defined by frequency of HED and sum of YAACQ experiences drinking in the last 30 days?	Demographics, Drinking Motives	High Risk (2 or more HED & 5 or more YAACQ) in the past 30 days, or Low Risk (all others)	stepwise logistic regression
RQ2B: Which set of variables is the most parsimonious for identifying students with high vs. low risk patterns of alcohol use as defined by of frequency of HED and sum of YAACQ experiences in the past 30 days?	Demographics, Drinking Motives	High Risk (2 or more HED & 5 or more YAACQ) in the past 30 days, or Low Risk (all others)	stepwise logistic regression with backward elimination
RQ3: What are the differences between the models identified in	Demographics, Drinking Motives		visual inspection of model differences

RQ1A, RQ1B, 2A, and 2B?			

Preliminary analyses included bivariate correlations and other descriptive statistics prior to full data analysis to answer research questions. Correlations were used to determine variables appropriate for consideration in the analysis procedures. Descriptive statistics were used to describe the demographics of the sample, as well as to assess normality among individual candidate variables given that normality is a requirement for the stepwise regression procedure. Stepwise logistic regression was used to answer research questions 1 and 2 to identify variables related to the dichotomous outcome variables noted, and to identify a parsimonious model of individual factors that contribute to hazardous/non-hazardous drinking (as defined by AUDIT scores) and to high/low risk drinking (as defined by Bernstein et al 2017).

Stepwise regression was used to identify variables that contribute to a prediction model. The *Stepwise logistic regression* procedure was used to identify a parsimonious model of candidate variables that predict status has a hazardous drinker and high and low risk as defined above. Exploration of the number of variables and the classification accuracy will be used to determine the most parsimonious model. For the stepwise regression procedure, each of the candidate variables (demographic variables, five drinking motives, was entered into the model simultaneously. For research questions 1QA and 1B, three steps were included using the forced entry method for each variable to understand changes in predictors based on total model composition. For research

questions 2a and 2b, backward elimination was used with alpha set at $p = .05$ for variables to enter or be removed from the regression model. A final model is identified with the most parsimonious prediction of the specified dependent variable.

Pilot Study

Purpose

The purpose of the pilot study is to test the survey implementation procedures, solicit feedback on clarity of survey items, and determine the average length of time to complete the study survey.

Pilot Study Research Questions (PRQs)

PRQ1: What is the time frame required to complete the survey?

PRQ2: Of the two response formats used for the Young Adult Alcohol Consequences Questionnaire, which do participants prefer?

PRQ3: Of the graphics depicting a standard drink, which do participants prefer?

PRQ4: What is the preferred number of MDMQ-R questions to be displayed on one screen?

Methodology

Participants. A convenience sample of participants were recruited for the current pilot study. Participants were doctoral students in a counselor education program in a mid-sized public university in the southeastern United States. Twenty-one participants were contacted to participate. Of the 21 participants recruited, 28.6% ($n = 6$) responded to the request to participate in the pilot study. Participants that responded identified as White ($n = 4$), Asian ($n = 1$), and Asian/American ($n = 1$). One participant

reported their age as 25, and the remaining five were 26 or older. All pilot study participants identified their biological sex as female.

Procedures. An email containing recruitment information and a link to the web-based study survey was sent to 21 doctoral students in counselor education. The email was sent directly from the Qualtrics web-based survey platform. Participants were asked to complete the online questionnaire, and upon completion of the main survey participants were automatically redirected to the pilot study questionnaire where they provided their feedback about web-based display formats and graphics.

An unanticipated error in survey flow from the main survey to the pilot study questions occurred during survey administration. This error in survey flow was noted by one of the pilot study participants. While this error in the survey flow was corrected for future administrations, two participants completed the dissertation survey with the error. This researcher emailed both participants a separate link to the pilot study questionnaire. For all other participants, the pilot survey was accurately integrated into the survey flow.

Measures. All measures in the pilot study are the same as the main study noted above in methodology. In addition to instrumentation, graphics and display formats were tested via an additional pilot study questionnaire containing 6 questions. Pilot study questions specifically addressed the pilot study research questions which will inform the full study (see Appendix D for the Pilot Study Questionnaire).

Two graphics depicting a standard drink were utilized throughout the main study survey, and participants were presented with both options in the pilot survey and asked to identify their preference and rational for such. For the pilot study, the YAACQ measure

was provided in two different formats, with the first portion presented in one format providing participants four response options per question (no, never; yes more than one year ago; yes in the past year; and yes in the past month; i.e., "four options"). The second portion presented in a different format that entailed response format in two columns, where participants answered yes or no in both columns with one column for the past 30 days and the second column inquiring about the past year (i.e., "two columns"). Screenshots of the presentation formats were utilized as responses to the pilot survey question. In the pilot study, the MDMQ-R questions were presented two separate ways, with 14 questions presented on the first page and 7 questions presented on each of two subsequent pages. Participants in the pilot study were asked how many MDMQ-R questions they would prefer to see displayed on each page (screen) of the questionnaire. Options were 8, 14, all, or "other".

Data Analysis

Average length of time to complete the survey was taken from the descriptive data provided by Qualtrics. Descriptive statistics were used to answer additional pilot study research questions.

Results

Dissertation questionnaire response times. For the pilot study, the response time for the dissertation questionnaire ranged from 12 minutes, 23 seconds to 29 minutes, 50 seconds (see Table 3.4). The 29:50 response time was a minimum of 12 minutes longer than other response times for participants. Specifically, the other five response times fell between 12 minutes, 23 seconds and 17 minutes, 53 seconds. Thus, most

participants took between 12 and 14 minutes to complete the dissertation survey, with average response time of 16 minutes, 31 seconds, and a median of 13 minutes, 6 seconds (average of 00:12:52 and 00:13:20). When the outlier of 29 minutes was removed, the average time to complete the survey was 13 minutes 51 seconds.

Standard drink graphic preference. Of the two graphics provided to participants, 100% chose the NIAAA graphic (see Table 3.5). Participants reported the NIAAA graphic was cleaner, felt more organized, had less text, and was easier to read than the alternative graphic with information about standard drink equivalencies for higher volume containers. Even though the alternative graphic included more information, the NIAAA graphic was preferred and sufficient options, one participant described the two-column response format as more visually appealing.

YAACQ response format. The majority of participants (83%, $n = 5$ participants) preferred the four-options response format versus the two-column format (see Table 3.6). Participants described the four-options response format as easier to follow and remember than the two columns (see Appendix F). Participants described the two-column format as confusing and more difficult to think about. While the majority of participants preferred the four-response format, one participant described the two-column response format as more visually appealing.

Table 3.4 Time Frame Required for Dissertation Questionnaire Completion

Participant	1	2	3	4	5	6	Mean
Response Time	13:20	17:53	12:52	12:23	29:50	12:48	16:31

Note. When participant 5 is removed from analysis, the mean response time is 13:51

Table 3.5 Participants' Preferred Graphic to Depict a Standard Drink

Participant	**Device Type**	**Graphic Choice**	**Graphic Explanation**
1	Desktop	NIAAA*	2nd graphic is easier to read...more clear with less images and less text
2	Laptop	NIAAA	Feels more organized. Not as much information as the other one, but still communicates relevant info.
3	Laptop	NIAAA	Less "clunky" -- easier to read; clearer
4	Laptop	NIAAA	Less wordy
5	Laptop	NIAAA	Cleaner Image
6	Laptop	NIAAA	blank

Note. * Participant 1 did not click on the response option but described it in the free text box.

Table 3.6 Participants' Preferred Display Format for YAACQ

Participant	Device Type	YAACQ Display	YAACQ Explanation
1	desktop	4 Options*	2nd format on the right...just a little more seamless for me to answer versus the first graphic I feel is prompting me to think about two separate time periods, which is a bit more difficult in the way it's presented for some reason
2	laptop	4 options	the other option gives me a chance to say "No" to in the past year column, which implies that I have said "No" in the past month.. so seems more "work"
3	laptop	2 columns	More visually appealing; easier to follow
4	laptop	4 options	Easier to follow and remember
5	laptop	4 options	The one with 2 columns/4 options is confusing...I answered both columns but wasn't sure if that was correct?
6	laptop	4 options	blank

*Participant 1 did not click on the response option but described in in the free text box.

MDMQ-R display. Half of the respondents preferred 8 MDMQ- R stems displayed on each page, while two participants (33%) preferred 14 items, and one participant preferred all items to be displayed on one page (see Table 3.7).

Table 3.7 Participants' Preferences for Number of MDMQ-R Questions Displayed

Participant	1	2	3	4	5	6
Device Type	desktop	laptop	laptop	laptop	laptop	laptop
# of Preferred MDMQ-R Questions per page	8	14	ALL	8	14	8

Discussion

Timing. The average time it took to complete the survey was 16:31, with the majority of participants taking 12 to 14 minutes. Originally, it was expected to take 20 to 30 minutes to complete the survey – as noted in the information sheet for participants. However, the time to complete the survey on average was less than the 20 to 30 minutes specified in the study information sheet. As a result of this finding, the time frame on the study information sheet provided to participants, and the recruitment email, will be shortened with hopes that it will increase the likelihood of participation. The time will be adjusted to say approximately 15 minutes.

Standard drink graphic. All participants indicated preference for the NIAAA standard drink graphic. Feedback on the rationale for this choice included it was easier to read, was a clearer/cleaner image, and was overall more organized in presentation. Prior to the implementation of the pilot study, three advisory committee members and the researcher also preferred the NIAAA graphic because it was clearer and more visually appealing; feedback was not requested from the fourth committee member. The availability of additional information in the second graphic is noted; however, it is also

potentially distracting for study participants. Though it may be important to consider calculations, it is understood that students may miscalculate consumption in general, so it is most important to identify an anchor to ensure that any miscalculations are based on the same standard. Regardless, the NIAAA standard drink graphic will be utilized in all areas of the survey where participants are provided with a reference for a standard drink.

YAACQ response format. Responses to the question of display formats for the YAACQ were mixed. Four of the five respondents (80%) preferred the format option that included four options, and one person preferred the 2-columns response format with yes/no options in each time period. Additionally, the speculative mobile display for the four-options response time is easier to read and respond to. For these reasons, the four-options response format will be utilized. The primary challenge with this question is the YAACQ was designed to be answered in a dichotomous response, yes/no format. Responses will be recoded to be consistent with dichotomous response in the identified time frames; however, if the instrument is not administered in the validated format, it may impact validity; thus, the psychometrics of the measure will be assessed prior to data analysis of the data from the main study.

MDMQ-R display. Preference for the number of MDMQ-R questions displayed on each page was varied. Fifty percent indicated a preference for eight MDMQ-R questions displayed at once and 33% preferred fourteen displayed at once. One participant shared with me directly that it was frustrating to scroll through the page with multiple responses, and it led to a desire to discontinue the survey. For this reason, it is reasonable to display a lesser number of sub questions on each page. It is noted however,

that the appearance of additional pages may also frustrate respondents. None of the pilot study participants completed the survey on mobile devices; however, in reviewing the projected display for mobile devices on the web-based platform, each question is presented with multiple response options rather than as a matrix question on the desktop version. The questions for the MDMQ-R will be displayed with 14 sentence stems per page/screen so the instrument is displayed on two pages rather than four as would be necessary if there are 8 stems displayed on each page.

CHAPTER IV

RESULTS

Chapter I was an introduction to the study with a focus on the purpose and intended outcomes of the research. Chapter II included a review of the literature on the prevalence of collegiate drinking, the Drug Free Schools and Communities Act, approaches to interventions, and intervention efficacy. Chapter III identified the methodology used for the current study to answer research questions. Results of analyses are described in this chapter. A description of the recruitment frame is outlined followed by a similar description of the study sample. Information about drinking behaviors for study participants is also included. Descriptive statistics for variables in the study are discussed along with outcomes of hypothesis testing.

Recruitment Sample Characteristics

Data from this study were extracted from a larger dataset which recruited 15,263 undergraduate students enrolled during the Spring 2019 semester at a medium-sized public university in the southeastern United States. Of the 15,263 students, 12,800 were aged 18 to 25 years, the identified age of interest for the study. Demographic characteristics of the 18-25-year-old student population are as follows. Class year was represented as Freshman (20.5%), Sophomore (21.5%), Junior (26.7%), Seniors (30%), and 1.3% are unclassified. Males made up 33.7% (n = 4312), and females (66.3%; n =

8488). Students were mostly White (44.2%), followed by Black or African American (30.3%), Hispanics of any race (11.2%), Asian (5.5%), Biracial or Multiracial (5.4%), Non-Resident Alien (2.1%), American Indian or Alaska Native (.3%), Native Hawaiian or Other Pacific Islander (.1%), and .8% unknown. Almost half (40.6%) of students 18-25 live on campus and 59.4% live off campus. 2.2% (n-278) were classified as student athletes. By parameters, the age range is 18-25 with the most students being 19, 20, or 21 (59.2%; (M = 20.56, Mdn =20; SD =1.804).

From the original 15,263 student population, there were 2,062 responses to the online questionnaire. Of those responses, about 78% met the age criteria; 21.5% (n = 445) did not meet the age requirement and were excluded. Additionally, 650 respondents were removed due to faulty or missing data (e.g. validation terms not matching or taking a less than average amount of time to complete the questionnaire). More specifically, in the pilot study, the average response time was 13 minutes, 51 seconds. The shortest response time in the pilot survey was 12 minutes, 23 seconds. In order to account for non-drinkers who might review questions about alcohol consumption and related consequences more quickly, the mark was set at 10 minutes for survey completion. Participants who completed the survey in less than 10 minutes were removed from analysis due to the likelihood of random responding. Additionally, there was a question that asked about the most recent consumption of alcohol (more than one year ago, in the past year, or in the past 30 days) and a later question inquiring about the frequency of heavy episodic drinking in the past 30 days. Participants who had inconsistent responses to those two questions were removed from analysis.

Study Sample Characteristics

The final sample consisted of 967 collegiate undergraduate students. The sample had an age range 18-25 with the mode = 21 (M = 20.63; SD = 1.69). Participants identified as Freshmen (18.3%), Sophomores (18.3%), Juniors (30.2%), and Seniors (33.2%). Students were mostly female (n = 834; 86.2%), with the remainder identifying as male (n = 133; 13.8%). Race was classified with multiple response options in addition to a separate question of whether or not a student identified as Hispanic (n = 128; 13.2%). Racial demographics are included along with other demographic data in Table 4.1 below and are not included in the regression analysis because there were insufficient observations in multiple groups to meet the standards for stepwise regression. In terms of current living status, there were similar numbers of students living on or off campus: 42.6% of study participants reported living on campus compared to 57.4% living off campus. A summary of college related demographic data for the recruitment sample and the study sample can be found in Table 4.1.

Social group membership was limited in the study sample. 8.4% were members of social Greek Letter Organizations (GLOs). Table 4.2 contains Social Group Membership Demographics. Self-report of athletic group membership varied from 2.5% to 5.6%. In the recruitment sample, NCAA participation was 2.2% (n = 278).

Participants were asked about their exposure to alcohol or other drug use by parents, relatives, or others in the home while growing up (Table 4.3). They were also asked to report of alcohol or other drug addiction or problems in biological relatives by the participant. A small majority of participants (50.35, n = 486) reported alcohol use by

biological relatives compared to 33.3% of participants (n = 322) who reported use of drugs by biological relatives. Almost half (42.2%) of participants reported having knowledge or experience of alcohol or other drug (AOD) use by people who lived in or frequently visited the homes where they grew up. When referring to oneself, most students (96.7%) reported no history of being charged with an alcohol violation on campus compared to 3.2% who did (n = 31).

Table 4.1 Demographics of the Study Sample and Recruitment Sample

Demographic Characteristic	*n*	*%*	*n*	*%*
	Study Sample		*Recruitment Sample*	
BIOLOGICAL SEX	133	13.8	13.8	13.8
Male	834	86.2	86.2	100
Female	967	100	100	
Total				
RACE	*Study Sample*		*Recruitment Sample*	
White - American, European, African	447	46.2	5657	44.2
Black - American, Caribbean, African*	298	30.8	3878	30.3
Latinx*	80	8.3		
Hispanics of any race*	128*	13.2*	1439	11.2
Asian or Asian American*	32	3.3	708	5.5
American Indian or Alaska Native	3	0.3	42	0.3
Pacific Islander *(or Native Hawaiian)*	1	0.1	7	0.1
Biracial or Multiracial	93	9.6	695	5.4
Other Races including International Students*	12	1.2	269	2.1
Missing/Unknown	1	0.1	105	0.8
Total	967	100	12800	100
CURRENT AGE	*Study Sample*		*Recruitment Sample*	
18	101	10.4	1628	12.7
19	173	17.9	2519	19.7
20	181	18.7	2560	20
21	242	25.0	2491	19.5
22	151	15.6	1712	13.4

23	56	5.8	929	7.3
24	40	4.1	568	4.4
25	23	2.4	393	3.1
Total	967	100	12800	100

CLASS YEAR	*Study Sample*		*Recruitment Sample*	
Freshman	177	18.3	2625	20.5
Sophomore	177	18.3	3421	26.7
Junior	292	30.2	3837	30
Senior	321	33.2	2747	21.5
Unclassified Undergraduate			170	1.3
Total	967	100	12800	100

Demographic Characteristic	*n*	%
CURRENT RESIDENCE	*Study Sample*	
on campus	412	42.6
off campus with parents	178	18.4
off campus with other family	31	3.2
off campus with friends	206	21.3
off campus alone	63	6.5
off campus with spouse, partner, or significant other	77	8
Total	967	100

HOUSING STATUS	*Study Sample*		*Recruitment Sample*	
Off Campus	555	57.4	7605	59.4
On Campus	412	42.6	5195	40.6
Total	967	100	12800	100

Note. There are differences in the way data was collected about race/ethnicity in the study and the way they are collected by the university. For this study, Hispanic is collected as an ethnicity; students in various racial categories also classified as Hispanic. Hispanic is not included in the counts for the study sample. Additionally, the University uses "nonresident alien" which seems roughly similar to international students in the sample.

Table 4.2 Social Group Membership Demographics

Demographics Characteristic	*n*	%
Collegiate Athletics Participation		
No	930	96.2
Yes	37	3.8
Total	967	100
Intramural Sport Participation		
Yes	54	5.6
No	913	94.4
Total	967	100
NCAA Athletics Participation		
Yes	24	2.5
No	943	97.5
Total	967	100
Sorority or Fraternity Membership		
Yes	81	8.4
No	886	91.6
Total	967	100

Table 4.3 Alcohol and Other Drug Family History and Exposure

Demographics Characteristic	*n*	%
Biological Family History - Drug		
No	644	66.6
Yes	322	33.3
Missing	1	0.1
Total	967	99.9
Biological Family History - Alcohol		
No	480	49.6
Yes	486	50.3
Missing	1	0.1
Total	967	100

Family History - Environmental	*n*	%
No	559	57.8
Yes	408	42.2
Total	967	1
Alcohol Citation History*		
No, Never	935	96.7
Yes, more than one year ago	23	2.4
Yes, in the past year	8	0.8
Missing	1	0.1
Total	967	100

Note: *Alcohol citation history is coded as yes or no in analysis.

Table 4.4 contains frequency information for age of onset to alcohol consumption and age initiation to experience with drunkenness. Age of onset to alcohol consumption was measured as less than 10 years and yearly to 25 or older; participants who responded with "0-10" were coded as 10. Non-responses (n = 70, 7.2%) are considered as never drinkers. Twenty-one respondents reported consuming their first drink as 0-10 years of age (n = 21; 2.2%). The majority (about 53%) of participants reported age of initiation to alcohol consumption as 16, 17, or 18 years old, with the mode equal to 18 (n = 226; 23.4%); M = 16.85; SD = 2.35). Age of initiation to drunkenness ranged from 11 years to 23 years; drinking participants were generally age18 years at the first experience of drunkenness (n = 224; 23.26%; M = 17.90, SD = 1.97); 17.9% of participants reported never having been drunk (n = 173) and 6.2% (n = 60) Identified as non-drinkers; 2.4% (n = 23) had missing data. Due the quantity of missing data and the correlation with age of onset to alcohol consumption, age of initiation to drunkenness was not included in analysis.

Frequency of HED

Of the 967 participants included in the study, 140 reported no alcohol use in the past year (14.5%); 136 students (14.1%) reported use in the last year but not in the past 30 days, and the majority (n = 691; 71.5%) reported alcohol use in the last 30 days. Frequency of heavy episodic drinking was measured in the last 30 days using sex-specific criteria. The number of episodes of HED in the past 30 days ranged from 0 to 20 with the majority of respondents (60.1%; n = 581) reporting zero episodes in the past 30 days. M = 0.94, SD = 1.93.

Table 4.4 Age of Alcohol Consumption and Experience of Drunkenness

Demographics Characteristic	*n*	%
AGE OF ONSET TO CONSUMPTION		
0-10 years old[a]	21	2.2
11 years old	5	0.5
12 years old	15	1.6
13 years old	34	3.5
14 years old	49	5.1
15 years old	96	9.9
16 years old	138	14.3
17 years old	139	14.4
18 years old	226	23.4
19 years old	71	7.3
20 years old	46	4.8
21 years old	54	5.6
22 years old	3	0.3
Missing	70	7.2
TOTAL	967	100
AGE OF INITIATION TO DRUNKENNESS		
I do not drink	60	6.2
I have never gotten drunk	173	17.9

11 years old	2	0.2
12 years old	3	0.3
13 years old	8	0.8
14 years old	21	2.2
15 years old	51	5.3
16 years old	68	7
17 years old	99	10.2
18 years old	224	23.2
19 years old	92	9.5
20 years old	64	6.6
21 years old	64	6.6
22 years old	12	1.2
23 years old	3	0.3
Missing	23	2.4
TOTAL	967	100

Note, [a] responses of 0 to 10 are coded as 10 in analysis

Young Adult Alcohol Consequences Questionnaire

Scores on 30-day Young Adult Alcohol Consequences Questionnaire (YAACQ) ranged from 0 to 24. Most participants (67.9%, $n = 657$) reported zero experiences of negative alcohol related consequences in the past 30 days. The next largest group scored 1-4 23.1% ($n = 224$). The remaining participants ($n = 86$; 8.9%) 8.9% scored 5 or more.

Alcohol Use Disorders Identification Test

Scores on the Alcohol Use Disorders Identification Test (AUDIT) ranged from 0 to 27 with *Mean* score = 4; *Median*= 2; *SD* = 3.80. Most students (64.9%; n = 628) scored 4 or less. For this sample, Cronbach's $\alpha = .779$. In applying the criteria for hazardous drinking (AUDIT ≥ 8), most participants (85.8%, n=830) scored 7 or less, and the remaining 14.2% (n=137) scored 8 or more, which is the criteria for hazardous

dinking. Males had a higher prevalence of hazardous drinking than females; 21.8% of males met the criteria for hazardous drinking compared to 12.9% of females.

Modified Drinking Motives Questionnaire-Revised

Table 4.6 contains information about scores on the five subscales of the Modified Drinking Motives Questionnaire – Revised. Mean scores on each subscale range from 1 to 5. Rank for motives types was social (2.49), Enhancement (2.04), Coping-Anxiety (1.70), Coping-Depression (1.37), and Conformity (1.21). Alpha coefficients for the Modified Drinking Motives Questionnaire – Revised were calculated using SPSS Statistics. Cronbach's $\alpha = .933$ for the 28-item instrument. Cronbach's α was also calculated for each of the subscales: Social (.838); Enhancement (.866); Coping-Anxiety (.783), Coping-Depression (.944), and Conformity (.847).

Table 4.5 Frequency of Heavy Episodic Drinking in the past 30 days

Frequency of HED	Frequency	Percent
0	581	60.1
1	191	19.8
2	82	8.5
3	44	4.6
4	23	2.4
5	21	2.2
6	5	0.5
7	2	0.2
8	3	0.3
10	7	0.7
15	3	0.3
20	2	0.2
Missing	3	0.3
TOTAL	967	100

Table 4.7 contains information about classification of dependent variables. High risk drinking is defined as experience of two or more episodes of HED in the last 30 days and affirmative response of experienced alcohol related consequences in the past 30 days. All other combinations were classified as low risk. Most participants (94.2%, $n = 911$) were classified as low risk drinkers, whereas 5.5% ($n = 53$) met the criteria for high risk drinking; 3 participants (.3%) remained unclassified due to missing data. A relatively small percentage (3.78% of males, $n = 5$) met the criteria for high risk drinking compared with 5.77 % of females ($n = 48$). There are differences in the number of participants who met the risk classification for each dependent variable. Table 4.8 is a crosstabulation of high/low risk drinking and hazardous/nonhazardous drinking classifications. Of the 964 participants who had complete data, 39 were classified as high-risk drinkers as well as hazardous drinkers. Fourteen (14) were classified as high risk but non-hazardous. Ninety-eight (98) were classified as low risk but met the criteria for hazardous drinking.

Table 4.6 Modified Drinking Motives Questionnaire-Revised

	N	Range	Min	Max	Mean	*SD*	Variance	Cronbach's α
Social Motives	966	4.00	1.00	5.00	2.49	1.00	1.001	0.838
Enhancement Motives	965	4.00	1.00	5.00	2.04	0.97	0.933	0.866
Coping-Anxiety Motives	964	4.00	1.00	5.00	1.70	0.82	0.673	0.783
Coping-Depression Motives	966	4.00	1.00	5.00	1.37	0.69	0.476	0.944

Conformity Motives	965	4.00	1.00	5.00	1.21	0.48	0.229	0.847
Valid N (listwise)	963							

Table 4.7. Classification of Dependent Variables

Demographics of Study Sample	*n*	*%*
HIGH AND LOW RISK DRINKING		
Low	911	94.2
High	53	5.5
Missing	3	0.3
Total	967	100
HAZARDOUS AND NONHAZARDOUS DRINKING		
Nonhazardous	830	85.8
Hazardous	137	14.2
Total	967	100

Table 4.8 Crosstabulation of High/Low Risk and Hazardous/Nonhazardous Drinking

High and Low Risk Drinking * Hazardous and Nonhazardous Drinking			
	"Nonhazardous"	"Hazardous"	Total
Low	813	98	911
High	14	39	53
Total	827	137	964

Logistic Regression Models: Results of Analysis

SPSS 25 was used to complete analysis. Prior to implementing the regression, point biserial correlations were used to understand relationships between dichotomous variables. The correlation between freshman classification and current age was $r = -.56$; however, both classification and current age were kept in the regression model due to variation in age range for each class year. There was a strong positive relationship between age of onset to alcohol use and age of initiation to drunkenness ($r = .626$; $p < .001$); thus, it was not included in the analysis. Coping-depression motives and coping-anxiety motives were highly correlated ($r = .727$), and thus are likely exhibit collinearity; however, both motives types are included in the model as they were found to measure different constructs on subscales of the Modified Drinking Motives Questionnaire-Revised. It is noted, however, that the relationship between these two variables will likely result in one of them demonstrating a suppressor effect on the other. Correlation tables are included in Appendix E.

Binary logistic, stepwise regression was used to explore the relationships between the independent variables and hazardous vs. non-hazardous drinking (research question 1) and high vs. low risk drinking (research question 2). In the regressions for research questions 1A and 2A, the "enter" method was used for each step to make three separate models for each dependent variable. The first model (Block 1) included alcohol citation history as this is typically one of the factors in which consequences and/or interventions to AOD policy violations on campus are determined. Block 2 (or Model 2) included the item from Model 1 along with the demographic and drinking-related variables added.

Finally, Block /Model 3 included candidate variables from Models 1 and 2 and added drinking motives.

Stepwise logistic regression with backward conditional elimination was used to answer research questions 1b and 2b. This process begins with all independent/candidate variables in the model, then removes variables one at a time based on their overall significance in the model. The probability values to enter and remove variables was set at $p = .05$. The final iteration of each model was selected as the most parsimonious model. Regression statistics for each of the models are included in Table 4.9 and 4.10 for prediction of hazardous drinking and Table 4.11 and 4.12 for prediction of high-risk patterns of drinking. Table 4.13 is a comparison of all four models.

Research question 1A. At block 1, alcohol citation history was significant at $p < .001$; Nagelkerke pseudo $R^2 = .022$. At block 2, when demographic and drinking variables were added, five of the 17 variables were significant: citation history ($p < .05$), freshman status ($p < .05$), biological sex (male; $p < .01$), intramural athletics participation ($p < .05$), and age of onset to alcohol consumption ($p < .01$); Nagelkerke pseudo $R^2 = .121$. Drinking Motives were added in block 3 for a total of 22 candidate variables. Significant contributors to the model in this final block included freshman status ($OR = 0.241, p < .01$), male sex ($OR = 2.013, p < .01$), age of onset to consumption ($OR = 0.901, p < .05$), social motives ($OR = 1.802, p < .001$), and coping-depression motives ($OR = 2.159, p < .001$); Model χ^2 (22) = 163.509, $p = .000$; Nagelkerke pseudo $R^2 = .296$.

Table 4.9 Model 3 for Research Question 1A Predicting Hazardous or Nonhazardous Drinking.

	Model 3						
	Bβ	S.E.β	Wald's χ^2	Sig.	Exp(B) OR	95% C.I. for EXP(B)	
						Lower	Upper
Constant	-1.824	2.338	0.609		0.161		
Alcohol Citation History(1)	0.883	0.483	3.350		2.419	0.939	6.227
Freshman(1)	-1.421	0.502	8.008	**	0.241	0.090	0.646
Sophomore(1)	-0.505	0.365	1.911		0.603	0.295	1.235
Junior(1)	-0.247	0.272	0.829		0.781	0.458	1.330
On or Off Campus Housing(1)	-0.263	0.255	1.066		0.769	0.467	1.266
Male (1) or Female	0.700	0.289	5.879	**	2.013	1.143	3.544
Collegiate Athletics Participation(1)	0.572	0.887	0.416		1.772	0.312	10.078
Club Sports(1)	-0.281	0.452	0.387		0.755	0.312	1.830
Intramural Athletics(1)	0.820	0.430	3.644		2.271	0.978	5.273
NCAA Athletics(1)	-0.434	1.067	0.165		0.648	0.080	5.246
Greek Membership(1)	0.354	0.334	1.121		1.424	0.740	2.740
Family History - Environmental(1)	0.135	0.237	0.328		1.145	0.720	1.821
Biological Family History - Alcohol(1)	-0.026	0.259	0.010		0.974	0.586	1.620

Biological Family History - Drug(1)	0.253	0.251	1.022		1.288	0.788	2.105
GPA	-0.068	0.176	0.148		0.934	0.661	1.320
Current Age	-0.054	0.093	0.335		0.948	0.791	1.136
Age of Onset to Alcohol Use	-0.105	0.048	4.801	*	0.901	0.820	0.989
Social Motives	0.589	0.145	16.579	***	1.802	1.357	2.394
Enhancement Motives	0.275	0.150	3.372		1.316	0.982	1.764
Conformity Motives	0.032	0.207	0.023		1.032	0.687	1.550
Coping-Depression Motives	0.770	0.187	16.927	***	2.159	1.496	3.116
Coping-Anxiety Motives	-0.179	0.185	0.939		0.836	0.582	1.201
			Model 3 χ^2 (22) = 163.509***				

Note: *denotes p <.05, ** denotes p <.01 , *** denotes p<.001, OR=Odds Ratio

The Hosmer and Lemeshow χ^2 (8) = 7.266; p = .508 indicating the final model was a good fit. The final model correctly classified 99.3% of nonhazardous drinkers; however, it should be noted that it correctly classified only 6% of hazardous drinkers for a total classification accuracy of 86%. The hypothesis that coping-depression motives, coping anxiety motives, and age of initiation to alcohol consumption would be included in the model was partially supported. Coping depression motives and age of onset to alcohol consumption were included, yet coping-anxiety motives were not. The absence of coping-anxiety motives in the final model is likely due to the linear relationship between

coping anxiety and coping-depression motives. Regression model information is included in Table 4.9. See full model at block 1 and 2 in Appendix F.

Research question 1B. The goal of research question 1B was to determine the most parsimonious model that explained hazardous drinking. Stepwise regression with backward elimination was utilized for this analysis. Twenty-two candidate variables were included with $p = .05$ to enter/remove as a condition. The analysis resulted in 17 iterations with six (6) predictors in the final step. Final predictors that remained in the model were alcohol citation history ($OR = 1.080$, p <.05), Freshman ($OR = 0.329$, $p <$ .01), biological sex (male) ($OR = 2.230$, $p < .05$), age of onset to alcohol consumption, ($OR = 0.896$, $p <. 05$), social motives ($OR = 2.069$ $p < .001$), and coping-depression motives ($OR = 2.101$, $p < .001$). Model χ^2 (6) = 149.796, $p = .000$. Hosmer and Lemeshow Chi Square test (6) = 17.424, $p = .026$ indicating the model was a poor fit. Nagelkerke pseudo $R^2 = .296$. Even so, the model correctly classified 97.4% of nonhazardous drinkers and 20.9% of hazardous drinkers. The overall success rate was 85.8%, which is slightly less than the classification rate for RQ1A, even though the classification success rate for hazardous drinkers is noticeably higher which makes it more useful for predicting hazardous drinking. See Table 4.10.

Research question 2A. The procedure for research question 2A was identical to that of RQ1A with exception of the dependent variable. In Model 1 (alcohol citation history was a significant predictor of hazardous drinking ($p < .05$) Nagelkerke pseudo R^2 = .015. In Model 2 demographics were added to alcohol citation history. Though multiple (*n=17*) demographic and drinking variables were included in this second block,

only age of onset to alcohol use ($p < .05$) was significant; Nagelkerke pseudo $R^2 = .091$. When drinking motives were added within the third and final block, three of the 22 candidate variables were statistically significant in explaining hazardous drinking: freshman class ($OR = 0.161, p < .05$), enhancement motives ($OR = 1.761, p < .05$) and coping-depression motives ($OR = 1.888, p < .05$); Nagelkerke pseudo $R^2 = .282$. Model χ^2 (22) = 92.398, p =.000. Hosmer and Lemeshow χ^2 (8) = 10.061; p = .261, indicating the model was a good fit. The model correctly identified 99.5% of nonhazardous drinkers and 10% of hazardous drinkers for an overall success rate of 94.4%. Table 4.11includes regression coefficients and significance for the third model. See full model at block 1 and 2 in Appendix G.

Research question 2B. The goal of research question 2B was to determine the most parsimonious model containing significant predictors to explain hazardous drinking. Stepwise regression with backward elimination was utilized for this analysis as it was for research question 1B. The analysis yielded 18 iterations with five (5) predictors in the final step. Predictors were freshman ($OR = 0.240, p <. 05$), age of onset to alcohol consumption, ($OR = 0.876, p <. 05$), social motives ($OR = 1.609, p < .05$), enhancement motives ($OR = 1.570, p < .05$) and coping-depression motives ($OR = 1.804, p < .001$); Nagelkerke pseudo $R^2 = .243$. Model χ^2 (5) = 78.833, p = .000. Hosmer and Lemeshow χ^2 (8) = 3.365. p = .909 indicating the model was a good fit for the data. The model correctly classified 99.5% of nonhazardous drinkers; however, it should be noted that it correctly classified only 6% of hazardous drinkers. The full model classified 10% of hazardous drinkers correctly; yet yielded only a 0.2% increase in total classification

accuracy. The overall success rate was 94.2%. There are five predictors in this model. The model in research question 1B has three significant predictors in a model containing 22 candidate variables. The hypothesis that coping-depression motives, coping-anxiety motives, and age of onset to alcohol consumption would be included is partially supported. As in Research question 1B, both coping-depression and age of onset to alcohol consumption are included in the model, however coping-anxiety motives are not. See Table 4.12 for information about the full regression model.

Research question 3. This question was designed to explore differences between the models identified in RQ1A, RQ1B, RQ2A, and RQ2B. Table 4.13 provides statistical information for candidate variables that were significant in any of the four models. Model 1A includes age of onset as a significant predictor; freshman status; biological sex, social motives, and coping-depression motives as significant predictors. Model 1B includes freshman status, biological sex, age of onset to consumption, alcohol citation history, social motives, and coping-depression motives. Model 2A includes freshman, enhancement motives, and coping-depression motives. Model 1B includes alcohol citation history, age of onset to alcohol consumption, freshman classification, biological sex (male), social motives, and coping-depression motives. Model 2B includes freshman classification, age of onset to alcohol use, social motives, enhancement motives, and coping-depression motives.

Table 4.10 Final Iteration of Analysis for RQ1B

Backward Stepwise Regression Model for Hazardous and Nonhazardous Drinking

Step 17[a]	B	S.E.	Wald	Sig.	Exp(B) OR	95% C.I.for EXP(B) Lower	Upper
Constant	-3.175	0.861	13.581	***	0.042		
Freshman (1)	-1.110	0.382	8.444	**	0.329	0.156	0.697
Male (1) or Female	0.802	0.276	8.472	**	2.230	1.299	3.827
Age of Onset to Alcohol Use	-0.109	0.045	5.786	*	0.896	0.820	0.980
Alcohol Citation History (1)	0.958	0.449	4.547	*	2.606	1.080	6.284
Social Motives	0.727	0.115	39.792	***	2.069	1.651	2.594
Coping-Depression Motives	0.742	0.124	36.138	***	2.101	1.649	2.676

Model χ^2 (6) = 149.796***

Note a. Variable(s) entered on step 1: Freshman, Sophomore, Junior, On or Off Campus Housing, Male or Female, Collegiate Athletics Participation, Club Sports, Intramural Athletics, NCAA Athletics, Greek Membership, Family History - Environmental, Biological Family History - Alcohol, Biological Family History - Drug, GPA, Current Age, Age of Onset to Alcohol Use, Alcohol Citation History, Social Motives, Enhancement Motives, Conformity Motives, Coping-Depression Motives, Coping-Anxiety Motives.
*denotes p <.05, ** denotes p <.01 , *** denotes p<.001, OR=Odds Ratio

Table 4.11 Model 3 for Research Question 2A Predicting High or Low Risk Patterns of Drinking

	Model 3						
	Bβ	S.E.β	Wald's χ^2	Sig.	Exp(B) OR	95% C.I.for EXP(B) Lower	Upper
Constant	-1.843	3.557	0.268		0.158		
Alcohol Citation History(1)	0.677	0.654	1.071		1.967	0.546	7.087
Freshman(1)	-1.826	0.752	5.889	*	0.161	0.037	0.704
Sophomore(1)	-1.007	0.572	3.106		0.365	0.119	1.120
Junior(1)	-0.613	0.432	2.014		0.542	0.232	1.263
On or Off Campus Housing(1)	-0.195	0.391	0.249		0.822	0.382	1.771
Male or Female(1)	-0.670	0.559	1.439		0.512	0.171	1.529
Collegiate Athletics Participation(1)	-2.688	3.723	0.521		0.068	0.000	100.436
Club Sports(1)	0.258	0.619	0.173		1.294	0.385	4.351
Intramural Athletics(1)	-1.265	1.114	1.288		0.282	0.032	2.508
NCAA Athletics(1)	2.054	3.722	0.305		7.797	0.005	11472.596
Greek Membership(1)	0.445	0.490	0.825		1.561	0.597	4.077
Family History - Environmental(1)	0.180	0.361	0.248		1.197	0.590	2.431
Biological Family History - Alcohol(1)	-0.471	0.404	1.362		0.624	0.283	1.377

Biological Family History - Drug(1)	0.316	0.386	0.670		1.372	0.644	2.922
GPA	0.108	0.293	0.136		1.114	0.628	1.977
Current Age	-0.110	0.141	0.601		0.896	0.679	1.182
Age of Onset to Alcohol Use	-0.129	0.072	3.180		0.879	0.763	1.013
Social Motives	0.413	0.219	3.576		1.512	0.985	2.321
Enhancement Motives	0.566	0.226	6.251	*	1.761	1.130	2.745
Conformity Motives	0.207	0.267	0.604		1.230	0.729	2.075
Coping-Depression Motives	0.636	0.250	6.451	*	1.888	1.156	3.084
Coping-Anxiety Motives	-0.113	0.267	0.180		0.893	0.529	1.508
			Model 3 χ^2 (22) = 92.398***				

Note: *denotes p <.05, ** denotes p <.01 , *** denotes p<.001, OR=Odds Ratio

The hazardous drinking models in RQ1A and RQ1B each contained freshman classification, biological sex, age of onset to alcohol consumption, and coping-depression motives as significant predictors. Male sex was a strong predictor in each of the hazardous risk models with odds 2.013 and 2.230 for the full model and the more parsimonious model, respectively. The model for RQ1B also included alcohol citation history, which was only present as a significant predictor in this model. Students who had a history of alcohol citation were 2.6 times more likely to meet the criteria for hazardous drinking than those who had no alcohol citation history. The models for high

and low risk patterns of drinking in RQ2A and 2B each included freshman classification, enhancement motives, and coping-depression motives as significant predictors. The model for RQ2B also included age of onset to alcohol consumption and social motives for drinking. Only the models using the dichotomous risk dependent variable included enhancement motives. Age of onset to alcohol consumption and social motives were included in each of the parsimonious models as well as to larger model predicting hazardous drinking. The odds ratios for age of onset to consumption predicting the at-risk outcome for each model was about 0.9 for each of the models, suggesting later ages of onset to alcohol consumption were protective factors for prediction of the risk outcome. Odds of social motives predicting the at-risk outcome ranged from 1.609 to 2.069. Odds were greatest in the more parsimonious hazardous risk model; however, it is noted that that model was not a good fit for the data overall. Even so, it seemed adequate for predicting the hazardous drinking risk outcome. Coping-depression motives were included in each of the four models. Odds were 1.804 and 1.888 for each of the higher risk prediction models and 2.159 and 2.101 for the hazardous drinking models. So, the strength of prediction was higher for hazardous drinking than high risk drinking; though, coping-depression motives were a strong predictor overall and seem to be the strongest predictor in each of the regression models. Table 4.11 is a list of variables included in the model for research questions 1A, 1B, 2A, and 2B as well as statistical analysis results. Review Tables 4.9, 4.10, and 4.11 for a table of variables included in each regression equation for the three research questions.

Table 4.12 Final Iteration of Analysis for RQ2B

Stepwise Conditional for HI-LO Risk								
Step 18[a]	B	S.E.	Wald	df	Sig.	Exp(B) OR	95% C.I.for EXP(B) Lower	Upper
Constant	-4.029	1.262	10.184	1	0.001	0.018		
Freshman(1)	-1.428	0.613	5.424	1	0.020	0.240	0.072	0.798
Age of Onset to Alcohol Use	-0.133	0.067	3.920	1	0.048	0.876	0.768	0.999
Social Motives	0.476	0.200	5.645	1	0.018	1.609	1.087	2.382
Enhancement Motives	0.451	0.194	5.397	1	0.020	1.570	1.073	2.298
Coping-Depression Motives	0.590	0.165	12.726	1	0.000	1.804	1.305	2.495
Model χ^2 (5) = 78.833***								

a. Variable(s) entered on step 1: Freshman, Sophomore, Junior, On or Off Campus Housing, Male or Female, Collegiate Athletics Participation, Club Sports, Intramural Athletics, NCAA Athletics, Greek Membership, Family History - Environmental, Biological Family History - Alcohol, Biological Family History - Drug, GPA, Current Age, Age of Onset to Alcohol Use, Alcohol Citation History, Social Motives, Enhancement Motives, Conformity Motives, Coping-Depression Motives, Coping-Anxiety Motives.
*denotes p <.05, ** denotes p <.01 , *** denotes p<.001, OR=Odds Ratio

Table 4.13 Model Comparison Chart

	AUDIT Risk Hazardous and Nonhazardous Drinking		High and Low Risk Patterns of Drinking	
	RQ 1A - Block/Model 3	RQ 1B Step 17	RQ 2A Block/Model 3	RQ 2B Step 18
	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio
Alcohol Citation History		2.606		
Class Year: Freshman	0.241	0.329	0.161	0.240
Biological Sex	2.013	2.230		
Age of onset to alcohol consumption	0.901	0.896		0.876
Social Motives	1.802	2.069		1.609
Enhancement Motives			1.761	1.570
Coping-Depression Motives	2.159	2.101	1.888	1.804
Chi Square for Model (*df*), *p* value	χ^2 (22) = 163.509, p=.000	χ^2 (6) = 149.796, p=.000	χ^2 (22) = 92.398, p=.000	χ^2 (5) = 78.833, p=.000
-2Log Likelihood	587.031	600.744	291.027	304.591
Nagelkerke R^2	0.296	0.273	0.282	0.243
Hosmer & Lemeshow test	χ^2 (8) = 7.266; *p* =.508	χ^2 (8) = 17.424, *p* =.026	χ^2 (8) = 10.061; *p* =.261	χ^2 (8) = 3.365. *p* = .909
% Classified Absence of Risk	97.2	97.4	99.5	99.5
% Classified Risk	23.9	20.9	10	6
% Total Classification Accuracy	86	85.8	94.4	94.2

CHAPTER V

DISCUSSION

Chapter IV included descriptive statistics of the study sample and results of regression models. Chapter V, the current chapter is interpretation and discussion of those results. Descriptive statistics of the study sample are discussed along with reliability analysis of study instruments and differences between logistic regression models. Hypotheses are reviewed and discussed. Limitations of the study are identified along with implications for counselors, counselor educators, student affairs staff, and future research.

Participants

The final sample was 967 students enrolled at least half time at a mid-sized university in the Southeastern United States. Participants ranged in age from 18 to 25 with most participants being 19, 20, or 21. In the majority of research studies reviewed for this paper, study participants were within this age range. The range seems typical for the undergraduate population and demonstrates representation for age-graded collegiate experience. Characteristics of the study sample were similar to demographic characteristics of currently enrolled undergraduate students at the study institution. Participants were primarily female, which is not typical of studies about alcohol use in college students. So, results of this study may be useful for identifying risk factors or intervention targets for female college students. There was diversity in racial

representation. White students made up the largest racial group at 42%, followed by Black (30.8%), Latinx (13.2%), and other racial/ethnic groups. This study represents an observably more diverse sample compared to other studies of college alcohol use where 76 - 97% of participants are white (Borsari et al., 2012; LaBrie et al., 2011). Because the sample was diverse, it may be more generalizable to the collegiate students at large than previous studies with primarily white participants. Additionally, because the sample is representative of the population at UNCG, results are likely to be generalizable to the study body as a whole.

Of the 967 participants, 71.5% (n = 691) reported alcohol use in the past month, 14.1% (n = 136) reported alcohol use in the last year but not in the last 30 days, and 14.5% (n = 140) reported no alcohol use in the past year; this rate of drinking is higher than previously reported in 2016 when 48% of drinking students at the study institution reported have used in the past 30 days (ACHA/NCHA, 2016). In this study, about 86% of students reported some alcohol use in the past year which is consistent with 81.3% past year use in a national sample (Core Institute, 2013). The majority of participants reported zero experiences of having consumed 5 or more drinks in a sitting in the past two weeks (80.5%, n = 778), with 12.9% (n = 125) reporting one episode, 6.2% (n = 60) reporting two or more episodes and .4% (n = 4) did not respond to the question. About sixty percent (60.1%, n = 581) of students in this sample reported zero episodes of HED in the past 30 days (4 or more drinks in a sitting for females, and 5 or more for males), with about 40% reporting at least one experience of HED in the past 30 days. As is to be expected with low overall rates of drinking in the sample compared to national averages,

there were low numbers of participants who met the risk criterion for each of the dependent variables: 5.5% (n=53) were classified as high-risk drinkers, and 14.2% (n=137) were classified as hazardous drinkers.

Discussion of Exploratory Models

The goal of the current study was to examine a more holistic model that contained factors that relate to hazardous and/or high risk drinking among college students, in hopes of finding a better way for individuals to implement prevention and intervention strategies on college campuses. Historically, staff at colleges and universities have assigned students who have violated their AOD policies to interventions based on whether or not it was their first violation of university policy and whether the violation involved alcohol or other drugs (Asher, 2008; Carey et al., 2016; Juhnke et al., 2002). At times, interventions have been modified to accommodate for differences in patterns of consumption and consequences for males and females (LaBrie et al., 2010). In the current study, alcohol citation history was a predictor of the hazardous drinking outcome in the backward elimination model to predict hazardous drinking; however, it was not a significant predictor in any of the other three models (i.e., full model predicting hazardous drinking, or either of the models predicting high risk), which indicates it may not be among the most influential predictors of higher risk outcomes. Although it was not found to be an influential variable in the current study, it continues to remain an important consideration in risk assessment as students mandated to alcohol interventions tend to drink more than their non-mandated peers (Merrill, Carey, et al., 2014). And one reason citation history may not have influenced the outcomes is due to the lower

percentage of hazardous and high-risk drinkers in the final sample, and the low percentage (about 3%) of students who reported a history of alcohol citation.

Though most students did not meet the criteria for high risk or hazardous drinking in the current sample, there were some who did, so it is important to consider approaches for prevention and intervention with these students in collegiate settings. The primary factors to consider included biological sex, freshman status, age of onset to alcohol consumption, social motives and coping-depression motives. Enhancement motives were also important to consider with high-risk drinking, but not for hazardous drinking. Coping motives (drinking to relieve negative emotions such as anxiety or depression) and enhancement motives (drinking to amplify positive experiences) are considered the "risky" drinking motives (V. V. Grant et al., 2007), so it is not surprising that coping-depression motives and enhancement were predictive of both at-risk outcomes. In previous research, enhancement motives were directly related to alcohol consumption, and coping-depression motives are predictive of alcohol related consequences by way of their relationship with increased alcohol consumption (V. V. Grant et al., 2007). Enhancement motives were a significant predictor of higher risk patterns of drinking in this study, which suggests that students who drink to improve, enhance, or maintain positive experiences are more likely to meet the criteria for high risk drinking than students who do not have this motive for drinking. More specifically, when the relationship between enhancement motives and high risk is considered, the odds of meeting the high-risk criterion are 1.761 in the full model and 1.570 in the more parsimonious model, which indicates students who report higher levels of enhancement

motives are 1.5 to almost 2 times more likely to meet the classification criteria for high risk. Given the known relationship between enhancement motives and increased alcohol consumption, it is not surprising that enhancement motives were only included in the high-risk models as a factor in high risk determination was frequency of HED, and this was not a factor in the final model predicting hazardous drinking.

Another factor that stood out in the current models predicting hazardous drinking was biological sex. Generally, men and women demonstrate different patterns of drinking. Men tend to consume alcohol at higher rates (Caamaño-Isorna F et al., 2017; Carey & DeMartini, 2010; Merrill, Wardell, et al., 2014) than females, are more likely to engage in HED (Yusko et al., 2008a), and are more likely to experience higher levels of alcohol related consequences than women (Merrill, Wardell, et al., 2014). So, it is not surprising that more males (21.8%) met the criteria for hazardous drinking than females (12.9%) in the current study, or that biological sex was a significant predictor (*OR*s 2.013 and 2.23) of classification as a hazardous drinking via AUDIT scores. This difference may be due to the likelihood that males would score higher on question 3 of the AUDIT, as it inquires about the frequency of consuming six or more drinks in a sitting in the past year. This definition of 6 drinks in one sitting is higher than the established standards defining heavy episodic drinking for males and females as 5 or more or 4 or more drinks in a single sitting. Notably, however, - and unlike the hazardous drinking results - there was not as stark of a difference in representation of males and females in the high-risk determination (males, 3.78%, females, 5.77%). This may be due to the use of a sex-based measure of HED being utilized to make risk determination.

Students in their first or second year of college and students who are under age who consume alcohol are more likely to engage in HED and experience problems related to their alcohol use than upperclassmen and older students who consume alcohol (Merrill, Wardell, et al., 2014). Additionally, students under 21 who drink report being drunk on more occasions in the past 30 days than students who are over 21 and are more likely to report serious consequences related to their alcohol use (Wechsler, Lee, Kuo, et al., 2002). Given this knowledge from previous research, it is not surprising that freshman class year was a significant predictor in each of the four regression models, though the odds ratios were low (.161 to .329). This pattern points to the importance of targeting intervention. Though universities often require prevention programs (usually online) for incoming students, there remains a clear relationship between freshman classification and hazardous or high-risk drinking. This may be due to the transition from living in a controlled environment to the freedoms associated with college life. Given that social motives and coping-depression motives are also factors, it may be important to train freshman on refusal skills in social situations as well as alternative methods of coping during this period of transition in their lives.

Age of onset to alcohol consumption was a significant predictor of the at-risk outcome in three of the four regression models. Similarly, earlier ages of onset were related to increased experience of alcohol related problems as well as increased likelihood of binge drinking in an earlier study (Buettner et al., 2010; Weitzman et al., 2003). It may be prudent for universities to use age of onset to alcohol consumption as a screening tool to target interventions for students. Interventionists might assess the

reasons for drinking (motives) as well as other factors such as family history that are also predictive of binge drinking which is related to early alcohol use.

A primary goal of this study was to understand how motives for drinking contribute the prediction of alcohol related outcomes. In the full models containing 22 variables to predict hazardous or high-risk drinking, when motives were added in the third step using forced entry, at least two motives types were shown as significant predictors and some variables significant in the second step were no longer significant predictors. The odds ratios for drinking motives ranged 1.57 to 2.16, compared to ratios below 1 for other significant predictors. This finding suggests that regardless of demographic factors, motives for drinking are a powerful predictor of drinking related outcomes. Since different types of drinking motives are associated with different patterns of consumption and consequences (Merrill, Carey, et al., 2014; Merrill, Wardell, et al., 2014), it is not surprising that the strength of motives as a predictor for each dependent variable is different. Enhancement motives were a significant predictor of high risk drinking, yet surprisingly, enhancement motives were not a significant predictor of hazardous drinking, despite the fact that Capron and Schmidt (2012) found a positive relationship between enhancement motives and AUDIT scores in heavy drinking college students. This difference in relationship between enhancement motives and AUDIT scores may be related to the inclusion of other variables in the regression model.

Social motives were the most prevalent drinking motives in this study as has been true in other studies (V. V. Grant et al., 2007; Mezquita et al., 2016). Social motives have a demonstrated positive relationship with quantity and frequency of alcohol

consumption (Cooper, 1994). The strength of the relationship for social motives as a predictor of hazardous drinking and high-risk drinking outcomes is not surprising (*OR*s = 1.61 to 2.07)

Coping-depression motives were a significant predictor in each of the four models. As coping-depression motives are considered "risky", this finding is not surprising. In general, undergraduate students who drink to cope with negative emotions experience a wide variety of alcohol-related problems (Merrill & Read, 2010). Coping-depression motives are specifically associated with various types of negative consequences including risky behaviors, impaired control, and physiological dependence (Merrill, Wardell, et al., 2014). So, the relationship with hazardous drinking was expected as the AUDIT is a screening tool to determine propensity for alcohol use disorders with questions related to alcohol consumption, consequences, and symptoms of chemical dependence such as impaired control (Higgins-Biddle & Babor, 2018; Saunders et al., 1993). Similarly, because high risk drinking is measured by experience of consequences related to alcohol use in the past 30 days, the relationship with coping-depression motives was expected. Interestingly, however, coping-anxiety motives were not a significant predictor in any of the regression models. This may be due to the high correlation between coping-anxiety and coping-depression motives (r = .727). When coping-depression motives were not considered in an exploratory analysis, coping-anxiety motives were a significant predictor in all models. The high correlation may suggest that coping-depression and coping-anxiety should be combined into one subscale

that includes coping-motives overall as in the four factor Drinking Motives Questionnaire (Cooper, 1994).

Regression models for high risk drinking included enhancement motives as a significant predictor. Enhancement motives are considered risky due to their relationship with alcohol consumption (V. V. Grant et al., 2007). They also have an indirect relationship to alcohol-related consequences by way of consumption (Merrill & Read, 2010; Merrill, Wardell, et al., 2014). Since risky drinking is defined by consumption and consequences, the presence of enhancement motives as a significant predictor is appropriate. The high-risk drinking measure is a composite of alcohol consumption and frequency of episodic drinking in the past 30 days. The frequency of heavy episodic drinking measure was sex-specific and was associated with lower quantities of use (4 drinks for females and 5 drinks for males in a single sitting in the past 30 days) than the consumption question on the AUDIT (frequency of consuming 6 or more drinks in a sitting in the past year). It is also noted that the questionnaire for this cross-sectional study was distributed after spring break, so it is possible there were increases in recent use due the timing of the study.

The primary purpose of this study was to explore a comprehensive model of inter- and intrapersonal factors that contribute to alcohol related risk. A secondary purpose was to understand the differences (and similarities) between high risk drinking as defined by (Bernstein et al., 2017) and hazardous drinking which was determined by AUDIT scores. In considering all four regression models, classification accuracy for non-risk categories are similar, yet there is difference in classification of the at-risk category. The AUDIT

hazardous risk models have a higher percentage of accurate classification for risk than the high-risk composite variable models, though, the high risk models have a higher greater all classification accuracy (about 94% compared to about 86% for hazardous risk models), likely due to near perfect classification accuracy for lower risk participants (99.5%). It is also noted that more students met the classification for hazardous drinking (n = 137) than for high-risk drinking (n = 53). Each of the models predicts improvement from the null model with Nagelkerke pseudo R2 ranging from .243 to .296. The models for research questions 1A, 2A, and 2B were adequate to good fits; however, the model for research question 1B was poorly fit based on the Hosmer & Lemeshow test; though each of the models was significant with all ps = .000. As discussed above, alcohol (or other drug) citation history has been a primary factor in determining assignment to interventions; however, findings from this study suggest that other factors such as age of onset to consumption and drinking motives may be more important factors to consider in risk determination. Even if interventions are not assigned based on these factors, it seems reasonable that intervention components would target drinking motives specifically as they are a prominent predictor of risk in all four models.

Findings from this study point to the importance of considering more holistic contributors to alcohol related risk in college students. Previous researchers have used a combination of HED and YAACQ to determine risk prior to intervention assignment and while those interventions were successful overall at reducing alcohol consumption and related problems, they were not successful for all students. Researchers suggest this lack of success may be due to the need for a more multifaceted risk determination. The results

of this study suggest that motives for drinking and age of onset to alcohol consumption may be important to assess as part of the risk determination process. Additionally, interventions in the studies mentioned above were designed to target alcohol-related consequences, specifically. The strength of the relationships between motives for drinking and risk outcomes (*OR*s 1.57 to 2.159) indicate that reasons for drinking are a powerful force in predicting alcohol-related risk. So, the lack of efficacy for some student in the (Bernstein et al., 2017; Borsari et al., 2012, 2016) interventions may be due the failure of the intervention content to address motives for drinking overall, and specifically coping motives. Since coping-motives are predictive of alcohol-related consequences (V. V. Grant et al., 2007; Merrill, Wardell, et al., 2014), it seems necessary for interventions to include education about alternative methods of coping with life experiences in order to adequately address students' needs.

Limitations

Although there are important findings in this study, they do not come without limitations. Social group status was considered as a potential predictor of risk outcomes, however, there was a low percentage of athletes and a low percentage or students who are members of social Greek letter organizations in the study. Thus, there may not have been sufficient membership in these social groups for either of them to serve as a significant predictor. It is noted, however, that in exploratory analysis, when coping-depression motives were removed from the list of candidate variables, other motives types were more likely to be significant as well as intramural sport participation ($p = .050$, $OR = 2.303$) in the full model with 21 candidate variables to predict hazardous drinking.

Other limitations include that the response rate was low with about 13% of students responding to the survey, and about half of that being useable data for an overall response rate of about 6%. In addition to the low response rate, it is also important to note that the difference between respondents and non-respondents. Even though the response rate was low, however, the sample represented the population of the university; thus, the results are likely to be generalizable to the study institution and may be generalizable to the collegiate population at large. It is noted, however, that alcohol consumption at the study institution may be lower than in college students in general. Concomitantly, only 5.5% of students met the criteria for high risk drinking and 14.2% met the criteria for hazardous drinking. So, it may be useful to replicate this study in a risky drinking sample to determine if the pattern of predictors remains the same.

Implications

Despite limitations, there are certain implications for findings of this study. The primary implication is a reconsideration of the factors to be utilized to assign interventions following AOD policy violations. Since alcohol citation history was only a significant predictor of AUDIT/hazardous drinking risk in the past year, it may not be the most appropriate measure of risk, especially given that patterns of drinking may fluctuate over time. It may be useful for university officials and intervention program administers to consider a student's reasons for drinking (drinking motives) in order to assign interventions. Change in assessment practices to assign students to interventions when AOD policy violation occurs may also be helpful. For the study institution (UNCG), specifically, results should be considered in making decisions about future prevention

strategies for the student body at large as well as for indicated interventions with mandated students.

Implications for Counseling and Student Affairs Professionals

As universities are required to develop and implement programs for primary and secondary prevention, results of this study may be useful in designing interventions for students. Freshman classification and coping-depression motives were included in each of the four models, so interventions that target freshman and that teach coping skills may be helpful. Both freshman class year and coping-depression motives have been associated with higher alcohol consumption and increased experience of alcohol related consequences (Capron & Schmidt, 2012; V. V. Grant et al., 2007). Additionally, students who begin drinking or getting drunk at earlier ages are more likely to initiate binge drinking in college (Weitzman et al., 2003). So, interventions that target alcohol consumption and consequences may serve to reduce the impact of the aforementioned risk factors on college students. The BMI implemented in Borsari et al., (2012 and 2016) is a modification of BASICS (Dimeff et al., 1999) designed to target alcohol-related consequences and demonstrated promising results. The Dimeff et al. (1999) intervention is brief version of the Alcohol Skills Training Program (ASTP; Fromme, Marlatt, Baer, & Kivlahan, 1994) which is a group intervention for young drinkers. The ASTP includes relaxation training and education about coping behaviors in addition to the personalized feedback and motivational interview included in the BASICS program. It may be helpful to return to the roots of alcohol skills training by implementing interventions to enhance relaxation and coping skills in order to have the greatest impact and problem reduction

for students who demonstrate risk. As it may be cumbersome to implement the full six-session ASTP in the university setting, it may be useful to modify the two-session BASICS BMI to include coping skills training as part of an add-on session. The skills taught/practices in ASTP Session 5 "simple relaxation techniques, breathing-focused meditation, and a variety of imagery techniques (p.147) (Fromme et al., 1994)

Because coping motives for drinking are associated with a variety of alcohol related consequences, it seems reasonable to design and implement interventions that teach positive coping skills. Depression and anxiety are highly correlated (Seligman & Ollendick, 1998); early anxiety is predictive of later depressive symptoms, and avoidance has been demonstrated as a partial mediator of the relationship between anxiety and depression in clinical and subclinical populations (Jacobson & Newman, 2014). Though there may be different types of interventions to address anxiety and depression, it is noted that the two are highly correlated as anxious mood has been demonstrated as a temporal predictor of depressed mood (Jacobson & Newman, 2014; Starr & Davila, 2012), and because depressive symptoms and anxious symptoms are often comorbid (Starr & Davila, 2008)intervention is often done simultaneously for both. Certainly, there is a strong positive correlation between coping-depression motives and coping-anxiety motives, suggesting that it may be appropriate to design interventions that address both issues and support overall coping skill development. By teaching alternative coping skills, counselors may help students address emotional concerns directly rather than using AOD to avoid emotional experiences and thereby decrease risk for future problem development. Interventions for AOD use in collegiate populations have traditionally

been focused on the development of refusal skills, protective behavioral strategies, and correcting normative perceptions in order to reduce consequences associated with use (Dimeff et al., 1999; Wilson, Cooper, Nugent, & Champion, 2016). Interventions such as the Alcohol Skills Training Program that teach coping skill development may serve to better prevent problem escalation. Since it may be cumbersome to implement the full version of the ASTP in the collegiate setting, it may be helpful to design and implement interventions that are specific to coping skills development as a brief intervention for indicated populations or even as a preventive intervention for targeted populations. At least one previous research group has included coping skills as part of a brief motivational intervention for mandated students and identified some benefit on problem reduction (Amaro et al., 2009). In considering the climate of the college campus and the stigma associated with substance use in general, it may be appropriate to design generic coping interventions as a universal prevention strategy for alcohol and other drug related problems as well as to prevent escalation of other mental health conditions.

Since AOD use is a public health concern, it is important to consider how to approach prevention and intervention systemically within the university setting. The social ecological model of health promotion (McLeroy, Kenneth R. et al., 1988) has been used to design intervention programs. The current study identified risk factors of coping motives, enhancement motives, male sex, and age of onset to alcohol use, so it may be helpful to target these factors in alcohol and drug interventions. On a policy level, it can be mandated for interventions to include coping skill identification and development. On the individual level, interventions to build distress tolerance, practice using healthy

coping skills, and educate students with early onset or male sex may be helpful to reduce future risk.

Implications for Counselor Educators

The 2016 CACREP standards identify learning objectives for masters- and doctoral- level counseling students. Counseling programs are required to include education and training related to the *theories and etiology of addictions and addictive behaviors* for all students as part of their professional orientation to the field, and there are specific requirements for counseling specialty tracks for addictions, clinical mental health, college counseling, and marriage and family counseling. The addictions counseling specialty track requires education about foundations, contextual dimensions, and practice related to addictions counseling. Under the foundations umbrella, results of this study contribute to understanding of theories of addiction, biopsychosocial case conceptualization and effects of substance use as well as assessments and tests related to addiction counseling. Contextually, understanding the interaction of factors related to risk allows for a fuller understanding of college students as a risk-group as well as the importance of total wellness and prevention programs including coping skills training. Practically speaking, the implications of this study contribute to the body of knowledge suggesting screening, assessment, and interventions for college AOD use which is an important consideration for training of clinicians and program development. The suggestion to increase the focus on coping skills interventions is a specific strategy for reducing the negative effects of alcohol and other drug use, thus reducing the risk of escalation of use to addiction levels. Understanding that influence of personal history

and motives may also have a positive influence student's and practitioners' understanding and attitudes towards AOD use and improve outcomes; this is important because negative attitudes toward addiction may impact client outcomes (Wolff & Hayes, 2009).

In addition to implications for the addictions counseling specialty track, there are important implications for training and education in other tracks. The college counseling and student affairs specialty track specifically requires education about the developmental nature of alcohol use and requires students to learn about strategies for preventing and intervening on addiction related issues with individuals in higher education setting. The marriages, couples, and family counseling specialty area also calls for training and education about the impact of addiction on marriages, couples, and families. And, the doctoral standards require training and education necessary to teach in each of these specialty areas. Thus, results of this study may be useful in meeting these goals. Results are especially useful for educations students in the college counseling and student affairs specialty track as they may operate in clinical or student affairs settings to provide professional counseling, program development, or program evaluation services in higher education settings.

Implications for Future Research

Considering the exploratory analysis of the relationships among variables when coping-depression motives are removed from candidacy, a natural next step is to further consider how different motives types interact with each other to explain risk. In considering the results of this study and the low level of membership in the *at-risk* categories, future research can further examine the differences between high and low risk

groups as well as between groups of hazardous and non-hazardous drinking. It may be helpful to identify if there are intrapersonal differences between groups or if the primary difference is in consumption and consequences. In addition to understanding difference between higher and lower risk groups, it may be helpful to explore sex differences. Wahesh and Lewis (2015) used logistic regression to identify which demographic and individual factors were associated with risk for hazardous drinking (AUDIT-C) in male and female college students. Results of their study indicated patterns of risk associated with experience of alcohol -related consequences, descriptive and injunctive norms, and outcome expectancies with different patterns of risk for male and female participants suggest "brief interventions can be tailored to target the common as well as unique psychosocial factors associated with problematic drinking" (p.29). So, it is possible that males and females in each of the designated risk groups in this study may have different patterns of covariation.

Conclusion

The purpose of this study was to explore a comprehensive model of psychosocial factors that contribute to alcohol related risk in college students and to subsequently identify the factors that result in parsimonious prediction of risk outcomes. Analysis of the results suggest different patterns of predictive factors for high risk patterns of drinking and hazardous drinking. Freshman classification, age of onset to consumption, social motives, and coping depression motives are significant contributors to prediction models. Enhancement motives may be included when biological sex is controlled as in the high-risk drinking model. Male sex is a significant contributor to models without

sex-specific measures of consumption or risk as in the hazardous drinking model. Future research is needed to determine difference between high/low risk drinkers and hazardous/nonhazardous drinkers. Overall, the findings of this study have important implications for prevention and intervention programming on college campuses. Coping-depression motives for drinking are a primary predictor of risk outcomes, so designing and implementing coping skills interventions for primary or secondary prevention may reduce the likelihood of risk outcomes in collegiate settings.

REFERENCES

Abrams, G. B., Kolligian, J., Mills, D. L., & DeJong, W. (2011). Failure of College Students to Complete an Online Alcohol Education Course as a Predictor of High-Risk Drinking That Requires Medical Attention. *American Journal of Drug & Alcohol Abuse*, *37*(6), 515–519.

Amaro, H., Ahl, M., Matsumoto, A., Prado, G., Mule, C., Kemmemer, A., … Mantella, P. (2009). Trial of the University Assistance Program for Alcohol Use Among Mandated Students. *Journal of Studies on Alcohol and Drugs*, *70*, 45–56.

Asher, K. (2008). *Educating College Students Through Judicial Response: Examining the Effectiveness of Judicial Sanctions for Alcohol-Related Violations*. Retrieved from http://d-scholarship.pitt.edu/7429/1/asherk_etd_2008.pdf

Austin, P. C., & Steyerberg, E. W. (2015). The number of subjects per variable required in linear regression analyses. *Journal of Clinical Epidemiology*, *68*(6), 627–636. https://doi.org/10.1016/j.jclinepi.2014.12.014

Baer, J. S. (2002). Student factors: understanding individual variation in college drinking. *Journal of Studies on Alcohol, Supplement*, (s14), 40–53. https://doi.org/10.15288/jsas.2002.s14.40

Barnett, N. P., & Read, J. P. (2005). Mandatory alcohol intervention for alcohol-abusing college students: A systematic review. *Journal of Substance Abuse Treatment*, *29*(2), 147–158. https://doi.org/10.1016/j.jsat.2005.05.007

Bernstein, M. H., Baird, G. L., Yusufov, M., Mastroleo, N. R., Carey, K. B., Graney, D. D., & Wood, M. D. (2017). A Novel Approach for Streamlining Delivery of Brief Motivational Interventions to Mandated College Students: Using Group and Individual Sessions Matched to Level of Risk. *Substance Use & Misuse*, *52*(14), 1883–1891.

Blackwell, E., & Conrod, P. J. (2003). *A five-dimensional measure of drinking motives.* Dissertation, University of Brittish Columbia.

Bolin, R. M., Pate, M., & McClintock, J. (2017). The impact of alcohol and marijuana use on academic achievement among college students. *The Social Science Journal*, *54*(4), 430–437. https://doi.org/10.1016/j.soscij.2017.08.003

Borsari, B. (2005). Stepped care: Promising intervention with mandated college students. *DATA: The Brown University Digest of Addiction Theory & Application*, *24*(1), 8–8.

Borsari, B., & Carey, K. B. (2000). Effects of a Brief Motivational Intervention With College Student Drinkers. *Journal of Consulting & Clinical Psychology*, *68*(4), 728.

Borsari, B., & Carey, K. B. (2003). Descriptive and Injunctive Norms in College Drinking: A Meta-Analytic Integration. *Journal of Studies on Alcohol*, *64*(3), 331.

Borsari, B., & Carey, K. B. (2005). Two brief alcohol interventions for mandated college students. *Psychology of Addictive Behaviors*, *19*(3), 296–302. https://doi.org/10.1037/0893-164X.19.3.296

Borsari, B., Mastroleo, N. R., Barnett, N. P., Kahler, C. W., Short, E. E., Hustad, J. T. P., … Monti, P. M. (2012). Addressing Alcohol Use and Problems in Mandated College Students: A Randomized Clinical Trial Using Stepped Care. *Journal of Consulting & Clinical Psychology*, *80*(6), 1062–1074.

Borsari, B., Mastroleo, N. R., O'Leary Tevyaw, T., Magill, M., Hustad, J. T. P., Barnett, N. P., … Monti, P. M. (2016). Mandated College Students' Response to Sequentially Administered Alcohol Interventions in a Randomized Clinical Trial Using Stepped Care. *Journal of Consulting & Clinical Psychology*, *84*(2), 103–112.

Borsari, B., Short, E. E., Mastroleo, N. R., Hustad, J. T. P., Tevyaw, T. O., Barnett, N. P., … Monti, P. M. (2014). Phone-delivered brief motivational interventions for mandated college students delivered during the summer months. *Journal of Substance Abuse Treatment*, *46*(5), 592–596.

Borsari, B., Tevyaw, T. O., Barnett, N. P., Kahler, C. W., Monti, P. M., & O'Leary Tevyaw, T. (2007). Stepped care for mandated college students: a pilot study. *American Journal on Addictions*, *16*(2), 131–137.

Boyd, C. J., McCabe, S. E., & d'Arcy, H. (2004). Collegiate Living Environments: A Predictor of Binge Drinking, Negative Consequences, and Risk-Reducing Behaviors. *Journal of Addictions Nursing*, *15*(3), 111–118. https://doi.org/10.1080/10884600490491204

Bronfenbrenner, U. (1979). *The ecology of human development: experiments by nature and design*. Retrieved from http://www.gbv.de/dms/bowker/toc/9780674224568.pdf

Bronfenbrenner, U. (2005). *Making human beings human: bioecological perspectives on human development*. Retrieved from http://catdir.loc.gov/catdir/toc/ecip0415/2004003255.html

Buettner, C. K., Bartle-Haring, S., Andrews, D. W., & Khurana, A. (2010). Perceptions of alcohol policy and drinking behavior: Results of a latent class analysis of college student drinkers. *Addictive Behaviors*, *35*(6), 628–631. https://doi.org/10.1016/j.addbeh.2010.01.011

Caamaño-Isorna F, Moure-Rodríguez L, Doallo S, Corral M, Rodriguez Holguín S, & Cadaveira F. (2017). Heavy episodic drinking and alcohol-related injuries: An open cohort study among college students. *Accident; Analysis and Prevention*, *100*, 23–29. https://doi.org/10.1016/j.aap.2016.12.012

Caldeira, K. M., Kasperski, S. J., Sharma, E., Vincent, K. B., O'Grady, K. E., Wish, E. D., & Arria, A. M. (2009). College students rarely seek help despite serious substance use problems. *Journal of Substance Abuse Treatment*, *37*(4), 368–378. https://doi.org/10.1016/j.jsat.2009.04.005

Capone, C., & Wood, M. D. (2008). Density of Familial Alcoholism and Its Effects on Alcohol Use and Problems in College Students. *Alcoholism: Clinical & Experimental Research*, *32*(8), 1451–1458.

Capron, D. W., & Schmidt, N. B. (2012). Positive drinking consequences among hazardous drinking college students. *Addictive Behaviors*, *37*(5), 663–667. https://doi.org/10.1016/j.addbeh.2012.02.002

Carey, K. B., Carey, M. P., Henson, J. M., Maisto, S. A., & DeMartini, K. S. (2011). Brief alcohol interventions for mandated college students: comparison of face-to-face counseling and computer-delivered interventions. *Addiction*, *106*(3), 528–537.

Carey, K. B., Carey, M. P., Maisto, S. A., & Henson, J. M. (2006). Brief Motivational Interventions for Heavy College Drinkers: A Randomized Controlled Trial. *Journal of Consulting & Clinical Psychology*, *74*(5), 943–954.

Carey, K. B., Carey, M. P., Maisto, S. A., & Henson, J. M. (2009). Computer Versus In-Person Intervention for Students Violating Campus Alcohol Policy. *Journal of Consulting & Clinical Psychology*, *77*(1), 74–87.

Carey, K. B., & DeMartini, K. S. (2010). The motivational context for mandated alcohol interventions for college students by gender and family history. *Addictive Behaviors*, *35*(3), 218–223.

Carey, K. B., Garey, L., Scott-Sheldon, L. A. J., Elliott, J. C., & Carey, M. P. (2016). Alcohol Interventions for Mandated College Students: A Meta-Analytic Review. *Journal of Consulting & Clinical Psychology*, *84*(7), 619–632.

Carey, K. B., Henson, J. M., Carey, M. P., & Maisto, S. A. (2010). Perceived Norms Mediate Effects of a Brief Motivational Intervention for Sanctioned College Drinkers. *Clinical Psychology: Science & Practice*, *17*(1), 58–71.

College Drinking | National Institute on Alcohol Abuse and Alcoholism (NIAAA). (n.d.). Retrieved August 25, 2017, from https://niaaa.nih.gov/alcohol-health/special-populations-co-occurring-disorders/college-drinking

Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment*, *6*(2), 117–128. https://doi.org/10.1037/1040-3590.6.2.117

Cooper, M. L., Russell, M., Skinner, J. B., & Windle, M. (1992). Development and validation of a three-dimensional measure of drinking motives. *Psychological Assessment*, *4*(2), 123–132. https://doi.org/10.1037/1040-3590.4.2.123

Core Institute | Southern Illinois University. (n.d.). Retrieved August 25, 2017, from http://core.siu.edu/

Cortés Tomás, M. T., Giménez Costa, J. A., Motos-Sellés, P., Sancerni Beitia, M. D., & Cadaveira Mahía, F. (2017). The utility of the Alcohol Use Disorders Identification Test (AUDIT) for the analysis of binge drinking in university students. *Utilidad Del Alcohol Use Disorders Identification Test (AUDIT) En El Análisis Del Binge Drinking En Estudiantes Universitarios.*, *29*(2), 229–235.

Cox, W. M., & Klinger, E. (1988). A motivational model of alcohol use. *Journal of Abnormal Psychology*, *97*(2), 168–180. https://doi.org/10.1037/0021-843X.97.2.168

Cronce, J. M., & Larimer, M. E. (2011). Individual-focused approaches to the prevention of college drinking. *Alcohol Research & Health*, *34*(2), 210–221.

Dams-O'Connor, K., Martin, J. L., & Martens, M. P. (2007). Social norms and alcohol consumption among intercollegiate athletes: The role of athlete and nonathlete reference groups. *Addictive Behaviors*, *32*(11), 2657–2666.

DeMartini, K. S., & Carey, K. B. (2009). Correlates of AUDIT Risk Status for Male and Female College Students. *Journal of American College Health*, *58*(3), 233–239.

DeMartini, K. S., & Carey, K. B. (2012). Optimizing the use of the AUDIT for alcohol screening in college students. *Psychological Assessment*, *24*(4), 954–963. https://doi.org/10.1037/a0028519

Dimeff, L. A., Baer, J. S., Kivlahan, D. R., & Marlatt, G. A. (1999). *Brief Alcohol Screening and Intervention for College Students (BASICS): A Harm Reduction Approach* (1 edition). New York: The Guilford Press.

Doumas, D. M. (2017). Alcohol Use and Drinking Motives Among Sanctioned and Nonsanctioned Students. *Journal of College Counseling*, *20*(2), 113–125.

Doumas, D. M., Miller, R., & Esp, S. (2017). Impulsive sensation seeking, binge drinking, and alcohol-related consequences: Do protective behavioral strategies help high risk adolescents? *Addictive Behaviors*, *64*, 6–12.

Doumas, D. M., Turrisi, R., & Wright, D. A. (2006). Risk Factors for Heavy Drinking and Associated Consequences in College Freshmen: Athletic Status and Adult Attachment. *Sport Psychologist*, *20*(4), 419–434.

Eaton, N. R., Thompson, R. G. Jr., Hu, M.-C., Goldstein, R. B., Saha, T. D., & Hasin, D. S. (2015). Regularly drinking alcohol before sexual activity in a nationally representative sample: Prevalence, sociodemographics, and associations with

psychiatric and substance use disorders. *American Journal of Public Health*, *105*(7), 1387–1393. https://doi.org/10.2105/AJPH.2015.302556

Edwards, C. L., Fowler, S., Green, M., Kupper, A., Patkar, A. A., Hill, L., … Parris, W. (2015). Institutional Prevention Programs as Predictors of Binge Drinking Among Black Americans Attending Historically Black Colleges and Universities (HBCUs). *Negro Educational Review*, *66*(1/4), 89–99.

Eshbaugh, E. M. (2008). *Factors that predict self-perceived problem drinking among college students* (Vol. 52).

Evans, N. J., Forney, D. S., Guido, F. M., Patton, L. D., & Renn, K. A. (2009). *Student Development in College: Theory, Research, and Practice* (2 edition). San Francisco: Jossey-Bass.

Fairlie, A. M., DeJong, W., Stevenson, J. F., Lavigne, A. M., & Wood, M. D. (2010). Fraternity and Sorority Leaders and Members: A Comparison of Alcohol Use, Attitudes, and Policy Awareness. *American Journal of Drug & Alcohol Abuse*, *36*(4), 187–193.

Fearnow-Kenney, M., Wyrick, D. L., Milroy, J. J., Reifsteck, E. J., Day, T., & Kelly, S. E. (2016). The Effects of a Web-Based Alcohol Prevention Program on Social Norms, Expectancies, and Intentions to Prevent Harm among College Student-Athletes. *The Sport Psychologist*, *30*(2), 113.

Freeman, M. S. (2001). Innovative Alcohol Education Program for College and University Judicial Sanctions. *Journal of College Counseling*, *4*(2), 179.

Fromme, K., Marlatt, G. A., Baer, J. S., & Kivlahan, D. R. (1994). The alcohol skills training program: A group intervention for young adult drinkers. *Journal of Substance Abuse Treatment*, *11*(2), 143–154. https://doi.org/10.1016/0740-5472(94)90032-9

Grant, B. F., Goldstein, R. B., Saha, T. D., Chou, S. P., Jung, J., Zhang, H., … Hasin, D. S. (2015). Epidemiology of DSM-5 alcohol use disorder: Results from the National Epidemiologic Survey on Alcohol and Related Conditions III. *JAMA Psychiatry*, *72*(8), 757–766. https://doi.org/10.1001/jamapsychiatry.2015.0584

Grant, V. V., Stewart, S. H., O'Connor, R. M., Blackwell, E., & Conrod, P. J. (2007). Psychometric evaluation of the five-factor Modified Drinking Motives Questionnaire — Revised in undergraduates. *Reducing Alcohol Consumption in University Students*, *32*(11), 2611–2632. https://doi.org/10.1016/j.addbeh.2007.07.004

Hagman, B. T. (2016). Performance of the AUDIT in Detecting DSM-5 Alcohol Use Disorders in College Students. *Substance Use & Misuse*, *51*(11), 1521–1528.

Hansen, W., Dusenbury, L., Bishop, D., & Derzon, J. (2007). *Substance abuse prevention program content: Systematizing the classification of what programs target for change*. *22*(3), 351–360. https://doi.org/10.1093/her/cyl091

Higgins-Biddle, J. C., & Babor, T. F. (2018). A review of the Alcohol Use Disorders Identification Test (AUDIT), AUDIT-C, and USAUDIT for screening in the United States: Past issues and future directions. *The American Journal of Drug*

and Alcohol Abuse, *44*(6), 578–586. https://doi.org/10.1080/00952990.2018.1456545

Hogan, J., Gabrielsen, K., Luna, N., & Grothaus, D. (2002). *Substance Abuse Prevention: The Intersection of Science and Practice* (1 edition). Boston: Pearson.

Jacobson, N. C., & Newman, M. G. (2014). Avoidance mediates the relationship between anxiety and depression over a decade later. *Journal of Anxiety Disorders*, *28*(5), 437–445. https://doi.org/10.1016/j.janxdis.2014.03.007

Juhnke, G. A., Huffman, S. B., Nilsen, K. A., Adams, J. R., Dew, B. J., Jordan, J. P., … Schroat, D. A. (2002). Establishing an alcohol and other drug assessment and intervention program within an on-site counselor education research and training clinic. *Journal of Addictions & Offender Counseling*, *22*(2), 83–90. https://doi.org/10.1002/j.2161-1874.2002.tb00164.x

Juhnke, G. A., & Reel, J. J. (1999). An Integrated Counseling Model for Alcohol Abusing College Students. *Journal of College Counseling*, *2*(1), 89.

Kahler, C. W., Hustad, J., Barnett, N. P., Strong, D. R., & Borsari, B. (2008). Validation of the 30-Day Version of the Brief Young Adult Alcohol Consequences Questionnaire for Use in Longitudinal Studies. *Journal of Studies on Alcohol & Drugs*, *69*(4), 611–615.

LaBrie, J. W., Cail, J., Pedersen, E. R., & Migliuri, S. (2011). Reducing Alcohol Risk in Adjudicated Male College Students: Further Validation of a Group Motivational Enhancement Intervention. *Journal of Child & Adolescent Substance Abuse*, *20*(1), 82–98.

LaBrie, J. W., Tawalbeh, S., Shelesky, K., Pedersen, E. R., & Hummer, J. (2010). *Heads UP, A Harm Reduction Approach to Problematic Drinking Prevention and Intervention: A Manualized Treatment Program*. BookSurge Publishing.

LaBrie, J. W., Thompson, A. D., Huchting, K., Lac, A., & Buckley, K. (2007). A group Motivational Interviewing intervention reduces drinking and alcohol-related negative consequences in adjudicated college women. *Addictive Behaviors*, *32*(11), 2549–2562.

Larimer, M. E., & Cronce, J. M. (2002). Identification, Prevention and Treatment: A Review of Individual-Focused Strategies to Reduce Problematic Alcohol Consumption by College Students. *Journal of Studies on Alcohol. Supplement*, *63*, 148.

Larimer, M. E., & Cronce, J. M. (2007). Identification, prevention, and treatment revisited: Individual-focused college drinking prevention strategies 1999–2006. *Addictive Behaviors*, *32*(11), 2439–2468.

Lee, C. M., Cronce, J. M., Baldwin, S. A., Fairlie, A. M., Atkins, D. C., Patrick, M. E., … Leigh, B. C. (2017). Psychometric analysis and validity of the daily alcohol-related consequences and evaluations measure for young adults. *Psychological Assessment*, *29*(3), 253–263.

Logan, D. E., Kilmer, J. R., King, K. M., & Larimer, M. E. (2015). Alcohol Interventions for Mandated Students: Behavioral Outcomes From a Randomized Controlled Pilot Study. *Journal of Studies on Alcohol & Drugs*, *76*(1), 31–37.

Logan, D. E., Lewis, M. A., Mastroleo, N. R., Kilmer, J. R., & Larimer, M. E. (2015). The impact of defensiveness and incident reactions on post-sanction drinking behaviors among mandated students. *Addictive Behaviors*, *48*, 19–24.

Mallett, K. A., Bachrach, R. L., & Turrisi, R. (2009). Examining the Unique Influence of Interpersonal and Intrapersonal Drinking Perceptions on Alcohol Consumption Among College Students. *Journal of Studies on Alcohol & Drugs*, *70*(2), 178–185.

Martens, M. P., Smith, A. E., & Murphy, J. G. (2013). The Efficacy of Single-Component Brief Motivational Interventions Among at-Risk College Drinkers. *Journal of Consulting & Clinical Psychology*, *81*(4), 691–701.

Martens, M. P., Watson, J. C. I., Royland, E. M., & Beck, N. C. (2005). Development of the Athlete Drinking Scale. *Psychology of Addictive Behaviors*, *19*(2), 158–164. https://doi.org/10.1037/0893-164X.19.2.158

McLeroy, Kenneth R., Bibeau, Daniel, Steckler, Allan, & Glanz, Karen. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly*, *15*(4), 351–377.

Merrill, J. E., Carey, K. B., Lust, S. A., Kalichman, S. C., & Carey, M. P. (2014). Do students mandated to intervention for campus alcohol-related violations drink more than nonmandated students? *Psychology of Addictive Behaviors*, *28*(4), 1265–1270. https://doi.org/10.1037/a0037710

Merrill, J. E., & Read, J. P. (2010). Motivational pathways to unique types of alcohol consequences. *Psychology of Addictive Behaviors: Journal of the Society of*

Psychologists in Addictive Behaviors, *24*(4), 705–711. https://doi.org/10.1037/a0020135

Merrill, J. E., Wardell, J. D., & Read, J. P. (2014). Drinking Motives in the Prospective Prediction of Unique Alcohol-Related Consequences in College Students. *Journal of Studies on Alcohol and Drugs*, *75*(1), 93–102. (PMC3893636).

Mezquita, L., Stewart, S., Kuntsche, E., & V Grant, V. (2016). *Cross-cultural examination of the five-factor model of drinking motives in Spanish and Canadian undergraduates*. *28*.

Morgan, T. J., White, H. R., & Eun Young Mun. (2008). Changes in Drinking Before a Mandated Brief Intervention With College Students. *Journal of Studies on Alcohol & Drugs*, *69*(2), 286–290.

Park, C. L., & Grant, C. (2005). Determinants of positive and negative consequences of alcohol consumption in college students: alcohol use, gender, and psychological characteristics. *Addictive Behaviors*, *30*(4), 755–765. https://doi.org/10.1016/j.addbeh.2004.08.021

Pedersen, D. E., & Pithey, K. P. (2018). Romantic relationships, college student alcohol use, and negative consequences of drinking. *The Social Science Journal*, *55*(2), 198–207. https://doi.org/10.1016/j.soscij.2018.02.017

Peduzzi, P., Concato, J., Feinstein, A. R., & Holford, T. R. (1995). Importance of events per independent variable in proportional hazards regression analysis II. Accuracy and precision of regression estimates. *Journal of Clinical Epidemiology*, *48*(12), 1503–1510. https://doi.org/10.1016/0895-4356(95)00048-8

Peralta, R. L., & Barr, P. B. (2017). Gender orientation and alcohol-related weight control behavior among male and female college students. *Journal of American College Health*, *65*(4), 229–242.

Ray, A. E., Kim, S.-Y., White, H. R., Larimer, M. E., Mun, E.-Y., Clarke, N., … Huh, D. (2014). When less is more and more is less in brief motivational interventions: Characteristics of intervention content and their associations with drinking outcomes. *Psychology of Addictive Behaviors*, *28*(4), 1026–1040. https://doi.org/10.1037/a0036593

Read, J. P., Kahler, C. W., Strong, D. R., & Colder, C. R. (2006). Development and preliminary validation of the young adult alcohol consequences questionnaire. *Journal of Studies on Alcohol*, *67*(1), 169–177.

Read, J. P., Merrill, J. E., Kahler, C. W., & Strong, D. R. (2007). Predicting functional outcomes among college drinkers: Reliability and predictive validity of the Young Adult Alcohol Consequences Questionnaire. *Reducing Alcohol Consumption in University Students*, *32*(11), 2597–2610. https://doi.org/10.1016/j.addbeh.2007.06.021

Saunders, J. B., Aasland, O. G., Babor, T. F., de la Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption--II. *Addiction (Abingdon, England)*, *88*(6), 791–804.

Scaglione, N. M., Mallett, K. A., Turrisi, R., Reavy, R., Cleveland, M. J., & Ackerman, S. (2015). Who Will Experience the Most Alcohol Problems in College? The

Roles of Middle and High School Drinking Tendencies. *Alcoholism: Clinical & Experimental Research*, *39*(10), 2039–2046.

Schlossberg, N. K. (2011). The Challenge of Change: The Transition Model and Its Applications. *Journal of Employment Counseling*, *48*(4), 159–162.

Seligman, L. D., & Ollendick, T. H. (1998). Comorbidity of anxiety and depression in children and adolescents: an integrative review. *Clinical Child and Family Psychology Review*, *1*(2), 125–144.

Sheppard, M. E., Usdan, S. L., Higginbotham, J. C., & Cremeens-Matthews, J. L. (2016). Attitudes and Descriptive Norms of Alcohol-Related Problems as Predictors of Alcohol Use among College Students. *Journal of Alcohol & Drug Education*, *60*(1), 30–46.

Starr, L. R., & Davila, J. (2008). Differentiating Interpersonal Correlates of Depressive Symptoms and Social Anxiety in Adolescence: Implications for Models of Comorbidity. *Journal of Clinical Child & Adolescent Psychology*, *37*(2), 337–349.

Starr, L. R., & Davila, J. (2012). Temporal patterns of anxious and depressed mood in generalized anxiety disorder: A daily diary study. *Behaviour Research & Therapy*, *50*(2), 131–141.

Venegas, J., Cooper, T. V., Naylor, N., Hanson, B. S., & Blow, J. A. (2012). Potential Cultural Predictors of Heavy Episodic Drinking in Hispanic College Students. *American Journal on Addictions*, *21*(2), 145–149.

Vittinghoff, E., & McCulloch, C. E. (2006). Relaxing the Rule of Ten Events per Variable in Logistic and Cox Regression. *American Journal of Epidemiology*, *165*(6), 710–718. https://doi.org/10.1093/aje/kwk052

Wahesh, E., & Lewis, T. F. (2015). Psychosocial Correlates of AUDIT-C Hazardous Drinking Risk Status: Implications for Screening and Brief Intervention in College Settings. *Journal of Drug Education*, *45*(1), 17. https://doi.org/10.1177/0047237915596605

Wahesh, E., Milroy, J. J., Lewis, T. F., Orsini, M. M., & Wyrick, D. L. (2013). Hazardous Drinking by First-Year College-Athletes: The Differential Roles of Drinking Motives, Alcohol Consequences, and Season Status. *Journal of Alcohol & Drug Education*, *57*(2), 66–84.

Wechsler, H., 1932-, Lee, J. E., & Nelson, T. F. (2002). Underage college students' drinking behavior, access to alcohol, and the influence of deterrence policies: findings from the Harvard School of Public Health college alcohol study. *Journal of American College Health*, *50*(5), 223–236.

Wechsler, H., Lee, J. E., Kuo, M., Seibring, M., Nelson, T. F., & Lee, H. (2002). Trends in College Binge Drinking During a Period of Increased Prevention Efforts. *Journal of American College Health*, *50*(5), 203.

Weitzman, E. R., Nelson, T. F., & Wechsler, H. (2003). Taking up binge drinking in college: the influences of person, social group, and environment. *Journal of Adolescent Health*, *32*(1), 26–35. https://doi.org/10.1016/S1054-139X(02)00457-3

Weitzman, E. R., Ying-Yeh Chen, & Subramanian, S. V. (2005). Youth smoking risk and community patterns of alcohol availability control: a national multilevel study. *Journal of Epidemiology & Community Health*, *59*(12), 1065–1071.

Wertsch, J. V., & Bronfenbrenner, U. (2005). Making human beings human: Bioecological perspectives on human development. *British Journal of Developmental Psychology*, *23*(1), 143–151.

Wicki, M., Kuntsche, E., Eichenberger, Y., Aasvee, K., Bendtsen, P., Dankulincová Veselská, Z., … Vieno, A. (2017). Different drinking motives, different adverse consequences? Evidence among adolescents from 10 European countries. *Drug and Alcohol Review*, *36*(6), 731–741. https://doi.org/10.1111/dar.12572

Williams Jr., R. D., Perko, M. A., Belcher, D., Leaver-Dunn, D. D., Usdan, S. L., & Leeper, J. D. (2006). Use of social ecology model to address alcohol use among college athletes. *American Journal of Health Studies*, *21*(3/4), 228–237.

Wilson, S. L., Cooper, R. L., Nugent, W. R., & Champion, D. (2016). BASICS, ACT, mindfulness, and BMI: Effective evidence-based practices that treat collegiate high-risk drinking. *Journal of Human Behavior in the Social Environment*, *26*(1), 81–88.

Wolff, M. C. P. and C., & Hayes, J. A. P. (2009). Therapist Variables: Predictors of Process in the Treatment of Alcohol and Other Drug Problems. *Alcoholism Treatment Quarterly*, *27*(1), 51–65. https://doi.org/10.1080/07347320802586791

Wyrick, D. L., Milroy, J. J., Reifsteck, E. J., Rulison, K. L., Dudley, W. N., & Fearnow-Kenney, M. (2016). Investigating Risk Factors Predictive of Problem Outcomes

Experienced by First Year Drinking and Non-Drinking Collegiate Student-Athletes. *Journal of Alcohol & Drug Education*, *60*(3), 22–41.

Yusko, D. A., Buckman, J. F., White, H. R., & Pandina, R. J. (2008a). Alcohol, tobacco, illicit drugs, and performance enhancers: A comparison of use by college student athletes and nonathletes. *Journal of American College Health*, *57*(3), 281–289. https://doi.org/10.3200/JACH.57.3.281-290

Yusko, D. A., Buckman, J. F., White, H. R., & Pandina, R. J. (2008b). Risk for excessive alcohol use and drinking-related problems in college student athletes. *Addictive Behaviors*, *33*(12), 1546.

APPENDIX A

RECRUITMENT EMAIL

Hey Spartans!

TLDR: I'm a UNCG Alum ('04) and working on a doctorate. Help a Spartan out by completing my dissertation survey. The **first 100 participants** get a **$5 Starbucks giftcard! Follow this link to the Survey:** ${l://SurveyLink?d=Take%20the%20Survey}

--

If you're still reading, check this out. I'm Tasha Becton – UNCG Alum class of 2004 (BA, Psychology), and I came back to give this doctorate thing a go. (Bless my heart! And also YAY!). There are a lot of reasons why we make decisions, and I'm studying what influences college students' decisions to drink or not to drink! Help me learn more about this phenomenon.

Tasha (Hicks) Becton, '04 (and '19 – hopefully!)

Got Questions? Email me: lyhicks@uncg.edu or my advisor, Dr. Kelly Wester:

klwester@uncg.edu

#ineedyourhelp
#takemysurvey
#thanksyall

Follow this link to the Survey:
${l://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
${l://SurveyURL}

If you have a formal swing, I can appreciate that you are still reading. :) This email is to recruit your participation in a research study about college student alcohol consumption and behaviors. If you agree to participate, you will complete a web-based survey that includes questions about alcohol use and some demographic questions. It will take about 15 minutes to complete. The first 100 participants will receive a $5 Starbucks giftcard! Click HERE to go to the survey.

Follow this link to the Survey:
${l://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
${l://SurveyURL}

Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}

Version: 3/12/19

APPENDIX B

STUDY INFORMATION SHEET

Project Title: A study of the relationship between individual factors, alcohol consumption, and alcohol related consequences
Principal Investigator: Latasha Y. Hicks-Becton
Faculty Advisor: Kelly L. Wester

What is this all about?
I am asking you to participate in this research study because you are an undergraduate student at UNCG and might be eligible to participate in this study. This research project will only take about 20-30 minutes and will involve you completing a web-based survey about your personal history and current alcohol use. Your participation in this research project is voluntary.

How will this negatively affect me?
There are minimal risks for participation. It may be uncomfortable to reflect on some of the experiences inquired about in the survey. Alcohol and other drug use is often stigmatized and may result in social harm. There are foreseeable feelings of emotional discomfort in remembering and sharing life experiences.

What do I get out of this research project?
Potential benefits of this study may be the opportunity for self-reflection and examination of your experiences related to alcohol. There may be additional potential benefits to the university community based on your participation in the study as it is designed to improve understanding of the individual student factors related to alcohol consumption and experiences which may impact decisions about how procedures are carried out in the future.

Will I get paid for participating?
There is no guaranteed compensation for your participation in this study. There are, however, twenty-five Amazon gift cards available in the amount of $20 (twenty dollars) each for participants who complete the entire study. At the end of the survey you will have the option to enter a drawing for one of the gift cards.

What about my confidentiality?
Absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of Internet access. Please be sure to close your browser when finished so no one will be able to see what you have been doing. We will, however, do everything possible to make sure that your information is kept confidential unless disclosure is required by law. We will store all data in secure web-based platforms.

Though recruitment is via email, there is no direct connection between your email address, and your survey response (or lack of response). No personally individually identifying data will be collected as part of the survey. Refusal to participate will not result in any penalties or loss of benefits to which you are entitled. There is no federal certificate of confidentiality for this study. Participation in this research project will not impact your consequences for university policy violations.

What if I do not want to be in this research study?

You do not have to be part of this project. This project is voluntary and it is up to you to decide to participate in this research project. If you agree to participate, you may decide to stop at any time. Only participants who complete the full study survey will be able to enter the drawing for incentives.

What if I have questions?

You can ask Principle Investigator: Latasha Y. Hicks-Becton lyhicks@uncg.edu or Faculty Advisor: Kelly L. Wester klwester@uncg.edu anything about the study. If you have concerns about how you have been treated in this study call the Office of Research Integrity Director at 1-855-251-2351.

APPENDIX C

ORIGINAL STUDY QUESTIONNAIRE

What is your age (in years) as of today?

16	20	24
17	21	25
18	22	26 or older
19	23	

What is your class year?

Freshman	Senior
Sophomore	Masters student
Junior	Doctoral Student

How many credit hours are you enrolled in this semester?

0-3	6-8
4-5	9-11

What is your biological sex?

Male	Female

How do you describe your gender identity?

- o Male
- o Female
- o Transgender: Male to Female
- o Other (please specify):
  _____
- o Transgender: Female to Male
- o Gender Queer

How do you describe your race? Check all that apply.

- o Black/American
- o White/American
- o Asian/American
- o Black/Caribbean
- o Black/African
- o White/European
- o White/African
- o Asian
- o American Indian/Alaska Native
- o Pacific Islander
- o Latinx
- o Other - Please Specify
  _____
- o Other - Please Specify
  _____

Do you identify as Hispanic?

Yes	No

If you identify as an international student, what is your country of origin? _____

What is your approximate cumulative GPA? _____

What is your housing status? (Where are you living this semester?)

- o on campus
- o off campus alone
- o off campus with parents
- o off campus with other family
- o off campus with friends
- o recovery housing (i.e. Oxford House)
- o no stable housing
- o off campus with spouse, partner, or significant other

Following are some questions about social group membership.

Yes No

In the past year, have you been involved in club sports?

Yes No

In the past year, have you been involved in intramural sports?

Yes No

In the past year, have you been an **NCAA athlete?**

Yes No

Are you a member of a social fraternity or social sorority?

Yes No

This includes social **Greek letter organizations** in NPHC, NPC, IFC, NMGC, etc. It does not include strictly service or academic organizations.

Yes No

Following are some questions about your alcohol consumption behaviors. Please **read the questions carefully.** Some questions will ask about lifetime alcohol consumption, some will ask about alcohol consumption in the past 30 days, and others will ask about alcohol consumption in the past year.

How old were you (in years) when you FIRST CONSUMED an alcoholic beverage (please do not count sips such as a bris or your first communion)?

- o Select a choice below
- o 0-10 years old
- o 11 years old
- o 12 years old
- o 13 years old
- o 14 years old
- o 15 years old
- o 16 years old
- o 17 years old
- o 18 years old
- o 19 years old
- o 20 years old
- o 21 years old
- o 22 years old
- o 23 years old
- o 24 years old
- o 25 years or older

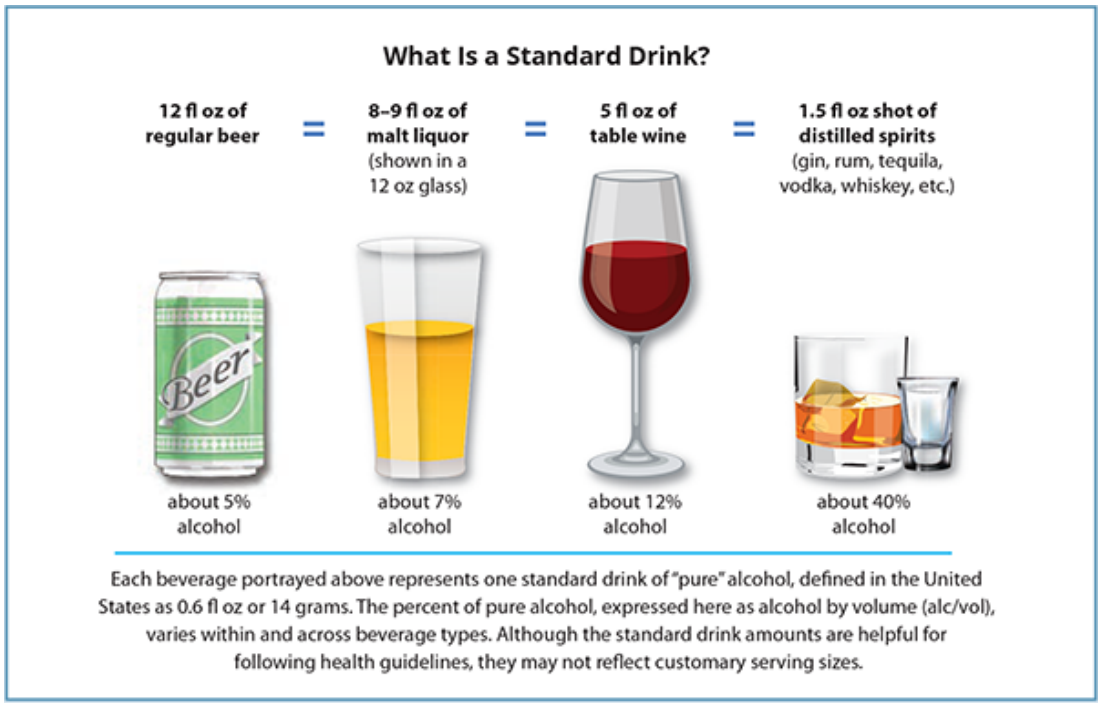
How old were you (in years) the first time you got drunk?

- I do not drink
- I have never gotten drunk
- 0-10 years old
- 11 years old
- 12 years old
- 13 years old
- 14 years old
- 15 years old
- 16 years old
- 17 years old
- 18 years old
- 19 years old
- 20 years old
- 21 years old
- 22 years old
- 23 years old
- 24 years old
- 25 years or older

Have you consumed alcohol in the past year?

- No, not in the past year.
- Yes, but not within the past month (30 days).
- Yes, in the past month (30 days).

Now, we ask some questions about your use of alcoholic beverages during the **past year.** By alcoholic beverages, we mean beer, wine, liquor, mixed drinks, etc. A graphic that helps you understand a standard drink is displayed below.



Alcohol Use Disorders Identification Test (AUDIT)

1. How often do you have a drink containing alcohol	Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week
2. How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more
3. How often do you have six or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
4. How often during the last year have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
5. How often during the last year have you failed to do what was normally expected of you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
7. How often during the last year have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
8. How often during the last year have you been unable to remember what happened the night before because of your drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
9. Have you or someone else been injured because of your drinking?	No		Yes, but not in the last year		Yes, during the last year

10. Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?	No		Yes, but not in the last year		Yes, during the last year
For females: How often do you have 4 or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
For males: How often do you have 5 or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
Have you ever been to **counseling or treatment** for an alcohol problem?	No, Never.		Yes, but not in the last year	Yes, in the last year.	Yes, in the last month (30 days)
Do you consider yourself a **problem drinker**?	Definitely yes	Probably yes	Might or Might not	Probably not	Definitely not
In the next 3 months, how difficulty do you think it would be to cut down or stop drinking?	Extremely easy	somewhat easy	neither easy nor difficult	somewhat difficult	extremely difficult

YOUNG ADULT ALCOHOL CONSEQUENCES QUESTIONNAIRE

Below is a list of things that sometimes happen to people either during, or after they have been drinking alcohol. Next to each item below, please mark an "X" in either the YES or NO column to indicate whether that item describes something that has happened to you **IN THE PAST YEAR and in the Past month**				
1. While drinking, I have said or done embarrassing things.	No Never	More than one Year ago	In the past year	In the past month
2. The quality of my work or schoolwork has suffered because of my drinking.	No Never	More than one Year ago	In the past year	in the past month
3. I have felt badly about myself because of my drinking.	No Never	More than one Year ago	In the past year	in the past month
4. I have driven a car when I knew I had too much to drink to drive safely.	No Never	More than one Year ago	In the past year	in the past month
5. I have had a hangover (headache, sick stomach) the morning after I had been drinking.	No Never	More than one Year ago	In the past year	in the past month
6. I have passed out from drinking.	No Never	More than one Year ago	In the past year	in the past month
7. I have taken foolish risks when I have been drinking.	No Never	More than one Year ago	In the past year	in the past month
8. I have felt very sick to my stomach or thrown up after drinking.	No Never	More than one Year ago	In the past year	in the past month
9. I have gotten into trouble at work or school because of drinking.	No Never	More than one Year ago	In the past year	in the past month

10. I often drank more than I originally had planned.	No Never	More than one Year ago	In the past year	in the past month
11. My drinking has created problems between myself and my boyfriend/girlfriend/spouse, parents, or other near relatives.	No Never	More than one Year ago	In the past year	in the past month
12. I have been unhappy because of my drinking.	No Never	More than one Year ago	In the past year	in the past month
13. I have gotten into physical fights because of drinking.	No Never	More than one Year ago	In the past year	in the past month
14. I have spent too much time drinking.	No Never	More than one Year ago	In the past year	in the past month
15. I have not gone to work or missed classes at school because of drinking, a hangover, or illness caused by drinking.	No Never	More than one Year ago	In the past year	in the past month
16. I have felt like I needed a drink after I'd gotten up (that is, before breakfast).	No Never	More than one Year ago	In the past year	in the past month
17. I have become very rude, obnoxious or insulting after drinking.	No Never	More than one Year ago	In the past year	in the past month
18. I have felt guilty about my drinking.	No Never	More than one Year ago	In the past year	in the past month
19. I have damaged property, or done something disruptive such as setting off a false fire alarm, or other things like that after I had been drinking.	No Never	More than one Year ago	In the past year	in the past month
20. Because of my drinking, I have not eaten properly.	No Never	More than one Year ago	In the past year	in the past month

21. I have been less physically active because of drinking.	No Never	More than one Year ago	In the past year	in the past month
22. I have had "the shakes" after stopping or cutting down on drinking (eg., hands shake so that coffee cup rattles in the saucer or have trouble lighting a cigarette).	No Never	More than one Year ago	In the past year	in the past month
23. My boyfriend/girlfriend/spouse/parents have complained to me about my drinking.	No Never	More than one Year ago	In the past year	in the past month
24. I have woken up in an unexpected place after heavy drinking.	No Never	More than one Year ago	In the past year	in the past month
25. I have found that I needed larger amounts of alcohol to feel any effect, or that I could no longer get high or drunk on the amount that used to get me high or drunk.	No Never	More than one Year ago	In the past year	in the past month
26. As a result of drinking, I neglected to protect myself or my partner from a sexually transmitted disease (STD) or an unwanted pregnancy.	No Never	More than one Year ago	In the past year	in the past month
27. I have neglected my obligations to family, work, or school because of drinking.	No Never	More than one Year ago	In the past year	in the past month
28. I often have ended up drinking on nights when I had planned not to drink.	No Never	More than one Year ago	In the past year	in the past month
29. When drinking, I have done impulsive things that I regretted later.	No Never	More than one Year ago	In the past year	in the past month
30. I have often found it difficult to limit how much I drink.	No Never	More than one Year ago	In the past year	in the past month

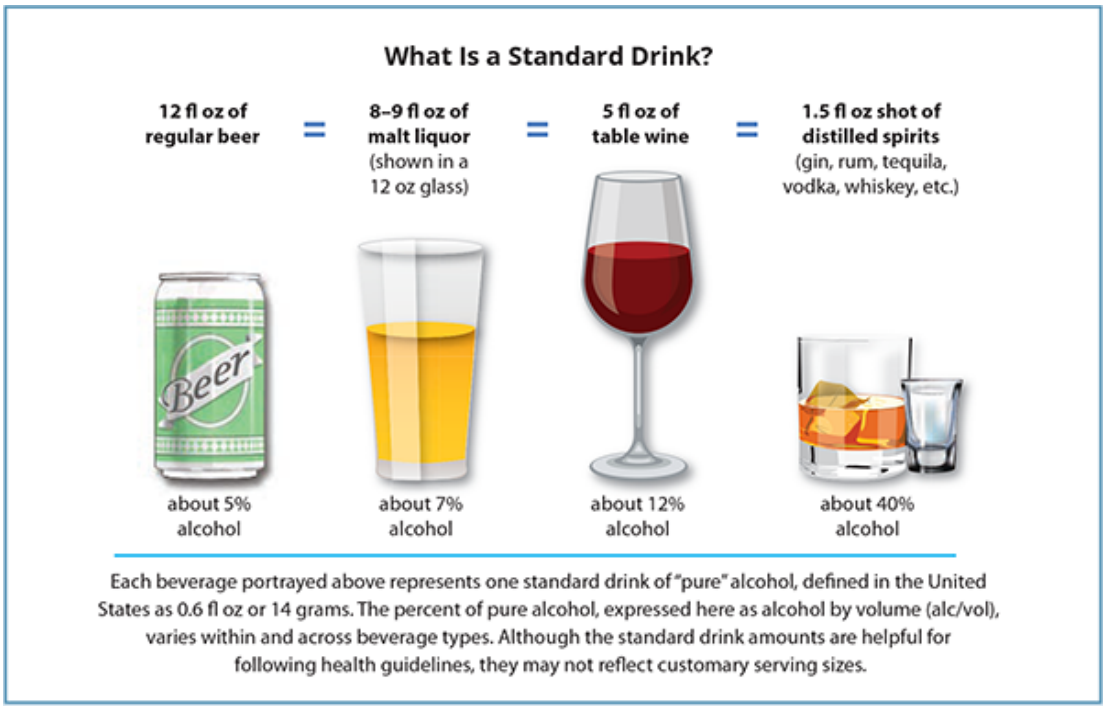
31. My drinking has gotten me into sexual situations I later regretted.	No Never	More than one Year ago	In the past year	in the past month
32. I've not been able to remember large stretches of time while drinking heavily.	No Never	More than one Year ago	In the past year	in the past month
33. While drinking, I have said harsh or cruel things to someone.	No Never	More than one Year ago	In the past year	in the past month
34. Because of my drinking I have not slept properly.	No Never	More than one Year ago	In the past year	in the past month
35. My physical appearance has been harmed by my drinking.	No Never	More than one Year ago	In the past year	in the past month
36. I have said things while drinking that I later regretted.	No Never	More than one Year ago	In the past year	in the past month
37. I have awakened the day after drinking and found that I could not remember a part of the evening before.	No Never	More than one Year ago	In the past year	in the past month
38. I have been overweight because of drinking.	No Never	More than one Year ago	In the past year	in the past month
39. I haven't been as sharp mentally because of my drinking.	No Never	More than one Year ago	In the past year	in the past month
40. I have received a lower grade on an exam or paper than I ordinarily could have because of my drinking.	No Never	More than one Year ago	In the past year	in the past month
41. I have tried to quit drinking because I thought I was drinking too much.	No Never	More than one Year ago	In the past year	in the past month

42. I have felt anxious, agitated, or restless after stopping or cutting down on drinking.	No Never	More than one Year ago	In the past year	in the past month
43. I have not had as much time to pursue activities or recreation because of drinking.	No Never	More than one Year ago	In the past year	in the past month
44. I have injured someone else while drinking or intoxicated.	No Never	More than one Year ago	In the past year	in the past month
45. I often have thought about needing to cut down or stop drinking.	No Never	More than one Year ago	In the past year	in the past month
46. I have had less energy or felt tired because of my drinking.	No Never	More than one Year ago	In the past year	in the past month
47. I have had a blackout after drinking heavily (i.e., could not remember hours at a time).	No Never	More than one Year ago	In the past year	in the past month
48. Drinking has made me feel depressed or sad.	No Never	More than one Year ago	In the past year	in the past month

ADDITIONAL CONSEQUENCES ITEMS

49. I have been cited for alcohol use by university staff or personnel.	No Never	More than one Year ago	In the past year	in the past month
50. I have been cited for drug use by university staff or personnel.	No Never	More than one Year ago	In the past year	in the past month
51. I have been mandated to attend or complete an alcohol education program as part of the campus judicial process.	No Never	More than one Year ago	In the past year	in the past month
52. I have been underweight because of drinking.	No Never	More than one Year ago	In the past year	in the past month
53. I have consumed alcohol in a residence hall on campus.	No Never	More than one Year ago	In the past year	in the past month

Following are some questions about your alcohol consumption behaviors. A standard drink chart is included below. Each time you see "drink" consider it to mean a "standard drink." Please **read the questions carefully.** Some questions will ask about lifetime alcohol consumption, some will ask about alcohol consumption in the past 30 days, and others will ask about alcohol consumption in the past year.



For Females: How many times in the last month **(30 days)** have you consumed **FOUR (4)** or more drinks in one sitting?_____

For Males: How many times in the last month **(30 days)** have you consumed **FIVE (5)** or more drinks in one sitting? _____

What is the maximum number of drinks you have had on any occasion or day in the past month **(30 days)?**_____

How many hours did you spend drinking on that occasion or day? _____

Modified Drinking Motives Questionnaire - Revised

The following questions are to understand the reasons why you drink.

If you do not drink, we would like to know how important each reason would be to you if you were to start drinking.

Thinking of all the times you drink, how often would you say that you drink for each of the following reasons?

Thinking of all the times you drink, how often would you say that you drink for each of the following reasons? If you do not drink, we would like to know how important each reason would be to you if you were to start drinking.					
I use alcohol….					
1. As a way to celebrate.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
2. To relax.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
3. Because I like the feeling.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
4. Because it is what most of my friends do when we get together.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
5. To forget my worries.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
6. Because it is exciting.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
7. To be sociable.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always

8. Because I feel more self-confident or sure of myself.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
9. To get a high.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
10. Because it is customary on special occasions.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
11. Because it helps me when I am feeling nervous.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
12. Because it's fun.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
13. Because it makes a social gathering more enjoyable.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
14. To cheer me up when I'm in a bad mood.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
15. To be liked.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
16. To numb my pain.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
17. Because it helps me when I am feeling depressed.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
18. So that others won't kid me about not using.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
19. To reduce my anxiety.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always

20. To stop me from dwelling on things.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
21. To turn off negative thoughts about things in my life.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
22. To help me feel more positive about things in my life.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
23. To stop me from feeling so hopeless about the future.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
24. Because my friends pressure me to use.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
25. To fit in with a group I like.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
26. Because it makes me feel good.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
27. To forget painful memories.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
28. So I won't feel left out	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
29. Because it helps you enjoy a party.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
30. Because it makes social gatherings more fun.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
31. Because it improves parties and celebrations.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always

32. To celebrate special occasions with friends.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
33. Because it helps you when you feel depressed or nervous.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always
34. In general, when I drink, I intend to get drunk.	Almost never/ Never	some of the time	about half of the time	most of the time	almost always /always

Following are some questions about your family history and the home environment where you grew up.

Thinking about your home environment(s) from childhood until you came to college. Have you lived in a home where others (parents, siblings, other family members or people who lived in or frequented the home) used alcohol or drugs on a regular basis?
Yes
No

In your opinion, have any of your biological relatives consumed alcohol in a way that you would describe as problematic or alcoholic?
Yes
No

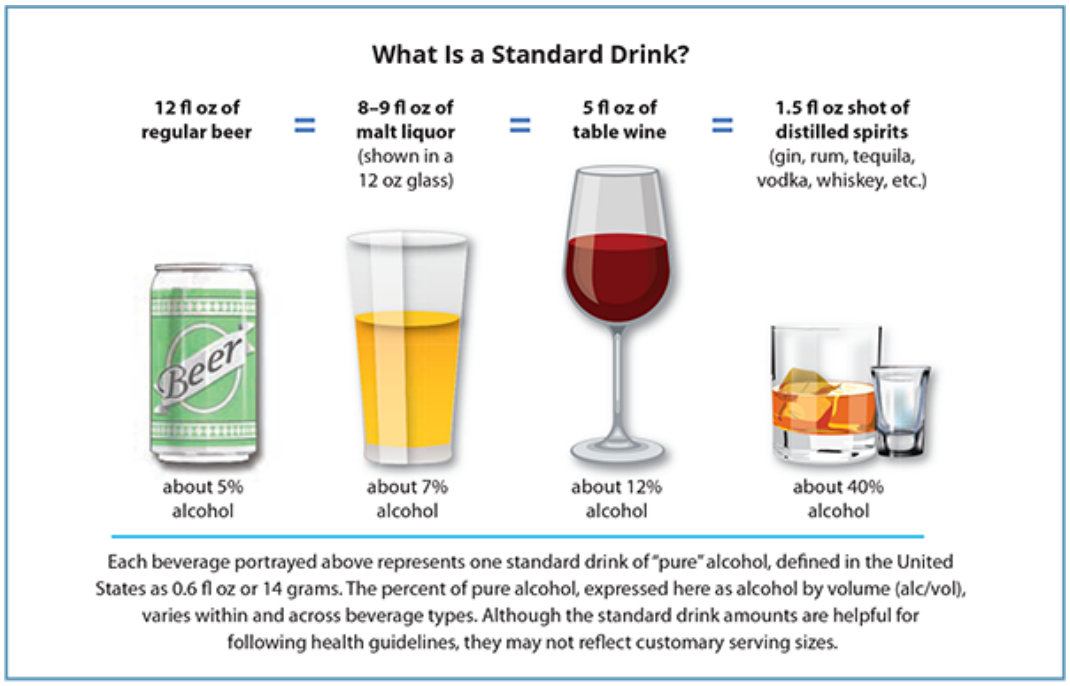
In your opinion, have any of your biological relatives used drugs in a way that you would describe as problematic or addicted?
Yes
No

Which family members do you believe have or have had a pattern of using alcohol or drugs in a way that you would describe as problematic? (Please check all that apply)

Biological Mother	Stepfather	Grandmother
Adoptive Mother	Sister	Other (Please specify)
Foster Mother	Brother	_____
Stepmother	Cousin	Other (Please specify)
Biological Father	Aunt	_____
Adoptive Father	Uncle	
Foster Father	Grandfather	

Your HEIGHT will be used to calculate your estimated blood alcohol content. Please enter your height in feet and inches. _____ Feet _____ Inches

Your WEIGHT will be used to calculate your estimated blood alcohol content. Please enter your WEIGHT in pounds (lbs). _____



IN THE CALENDAR BELOW, PLEASE FILL IN THE AMOUNT OF ALCOHOL YOU CONSUMED DURING A **TYPICAL WEEK** IN THE LAST MONTH (30 days).

First, think of a **TYPICAL WEEK** in the last month. Try to remember as accurately as you can when and how much you typically drank in a week during the last month. For each day of the week in the calendar below, fill in the **number of standard drinks typically consumed** on that day in the box.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of drinks in a TYPICAL WEEK in the past month (30 days)							
Number of hours spent drinking on this day							

IN THE CALENDAR BELOW, PLEASE FILL IN THE AMOUNT OF ALCOHOL YOU CONSUMED DURING A **HEAVY DRINKING WEEK** IN THE LAST MONTH (30 days).

First, think of a **heavy drinking week** in the last month. Try to remember as accurately as you can when and how much you drank when you were **drinking heavily**. For each day of the week in the calendar below, fill in the **number of standard drinks typically consumed on a heavy drinking day** in the box.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number of drinks in a HEAVY DRINKING WEEK in the past month (30 days)							
Number of hours spent drinking on this day							

Do you identify as a FIRST GENERATION college student?
Yes No

What is the highest grade or level of school that you have completed?

- Middle School (Grades 6-8)
- Freshman (Grade 9)
- Sophomore (Grade 10)
- Junior (Grade 11)
- Senior (Grade 12)
- High School Graduate
- Some College
- Graduated 2-year College
- Graduated 4-year College
- Post Graduate
- Prefer not to answer

What is the highest level of education attained by your father? (select the one that most applies)

- none
- Middle School (Grades 6-8)
- Freshman (Grade 9)
- Sophomore (Grade 10)
- Junior (Grade 11)
- high school graduate
- GED
- some college
- Associate Degree
- Bachelor Degree
- some graduate school
- Master Degree (MA, MSW, MPH, MS, MMS, etc)
- Doctoral Degree: EDD, PhD
- Professional Degree (MD, JD, Pharm D, DDS)
- technical school (electrician, plumber, welder)
- cosmetology or barber school

What is the highest level of education attained by your father? (select the one that most applies)

- none
- Middle School (Grades 6-8)
- Freshman (Grade 9)
- Sophomore (Grade 10)
- Junior (Grade 11)
- high school graduate
- GED
- Doctoral Degree: EDD,PhD
- technical school (electrician, plumber, welder)
- some college
- Associate Degree
- Bachelor Degree
- some graduate school
- Master Degree (MA, MSW, MPH, MS, MMS, etc)
- Professional Degree (MD, JD, Pharm D, DDS)
- cosmetology or barber school

APPENDIX D

PILOT STUDY QUESTIONNAIRE

Pilot Study Questionnaire

Thank you for being one of the first participants in my dissertation study. I am asking up to 100 people to participate in the pilot study which asks a few questions about the way you completed the survey, and the way graphics and questions are presented. Please answer the questions below.

Q1 What type of device did you use to complete the survey?

Smart Phone	laptop computer
Tablet/iPad	desktop computer

Q2 Two graphics depicting a standard drink were included in the survey and are included below. Of the graphics depicting a standard drink, which do you prefer?

Q3 Please explain why you prefer one graphic over the other:

_____

_____

_____

Q4 Two format options for the questions about experiences related to alcohol are included below. Of the format options for the questions about experiences related to alcohol included above, which format do you prefer?

Below is a list of things that sometimes happen to people either during, or after they have been drinking alcohol. Next to each item below, please mark the column to indicate whether that item describes something that has happened to you in the past month or in the past year.

	In the Past Month		In the Past Year	
	NO	YES	NO	YES
33. While drinking, I have said harsh or cruel things to someone.	○	○	○	○
34. Because of my drinking I have not slept properly.	○	○	○	○
35. My physical appearance has been harmed by my drinking.	○	○	○	○
36. I have said things while drinking that I later regretted.	○	○	○	○
37. I have awakened the day after drinking and found that I could not remember a part of the evening before.	○	○	○	○
38. I have been overweight because of drinking.	○	○	○	○
39. I haven't been as sharp mentally because of my drinking.	○	○	○	○
40. I have received a lower grade on an exam or paper than I ordinarily could have because of my drinking.	○	○	○	○
	NO	YES	NO	YES
41. I have tried to quit drinking because I thought I was drinking too much.	○	○	○	○
42. I have felt anxious, agitated, or restless after stopping or cutting down on drinking.	○	○	○	○
43. I have not had as much time to pursue activities or recreation because of drinking.	○	○	○	○
44. I have injured someone else while drinking or intoxicated.	○	○	○	○
45. I often have thought about needing to cut down or stop drinking.	○	○	○	○

○

Below is a list of things that sometimes happen to people either during, or after they have been drinking alcohol. Next to each item below, please mark the column to indicate whether that item describes something that has happened to you ever, more than one year ago, or in the past month.

	No Never	More than one year ago	in the past year	in the past month (30 days)
1. While drinking, I have said or done embarrassing things.	○	○	○	○
2. The quality of my work or schoolwork has suffered because of my drinking.	○	○	○	○
3. I have felt badly about myself because of my drinking.	○	○	○	○
4. I have driven a car when I knew I had too much to drink to drive safely.	○	○	○	○
5. I have had a hangover (headache, sick stomach) the morning after I had been drinking.	○	○	○	○
6. I have passed out from drinking.	○	○	○	○
7. I have taken foolish risks when I have been drinking.	○	○	○	○
8. I have felt very sick to my stomach or thrown up after drinking.	○	○	○	○

	No Never	More than one year ago	in the past year	in the past month (30 days)
9. I have gotten into trouble at work or school because of drinking.	○	○	○	○
10. I often drank more than I originally had planned.	○	○	○	○
11. My drinking has created problems between myself and my boyfriend/girlfriend/spouse, parents, or other near relatives.	○	○	○	○
12. I have been unhappy because of my drinking.	○	○	○	○

Q5 Please explain why you prefer one format option over the other.

_____

_____

_____

Q6

Thinking of all the times you drink, how often would you say that you drink for each of the following reasons?

I use alcohol....

	Almost Never/Never	Some of the time	About half the time	Most of the time	Almost Always/Always
1. As a way to celebrate.	O	O	O	O	O
2. To relax.	O	O	O	O	O
3. Because I like the feeling.	O	O	O	O	O
4. Because it is what most of my friends do when we get together.	O	O	O	O	O
5. To forget my worries.	O	O	O	O	O

	Almost Never/Never	Some of the time	About half the time	Most of the time	Almost Always/Always
6. Because it is exciting.	O	O	O	O	O
7. To be sociable.	O	O	O	O	O
8. Because I feel more self-confident or sure of myself.	O	O	O	O	O
9. To get a high.	O	O	O	O	O
10. Because it is customary on special occasions.	O	O	O	O	O

For the questions about reasons why you consume (or why you might consume) alcohol like the one displayed above, do you prefer to have:

8 questions per page

14 questions per page

All questions on one page

Other (Please Specify)

_____

APPENDIX E

CORRELATION TABLES

Correlations								
		Hi or Low Risk (DV)	AUDIT Risk	Alcohol Citation History	Freshman	Sophomore	Junior	Senior
DV: Hi or Low Risk	Pearson Correlation	1	.410**	.111**	-.067*	-0.020	0.001	.071*
	Sig. (2-tailed)		0.000	0.001	0.038	0.528	0.986	0.028
	N	964	964	963	964	964	964	964
DV: Hazardous/ non-Hazardous Drinking	Pearson Correlation	.410**	1	.145**	-.100**	-0.024	0.017	.085**
(AUDIT Risk)	Sig. (2-tailed)	0.000		0.000	0.002	0.464	0.598	0.008
	N	964	967	966	967	967	967	967
Alcohol Citation History	Pearson Correlation	.111**	.145**	1	-0.056	0.020	-0.030	0.059
	Sig. (2-tailed)	0.001	0.000		0.085	0.534	0.347	0.069
	N	963	966	966	966	966	966	966
Freshman	Pearson Correlation	-.067*	-.100**	-0.056	1	-.224**	-.311**	-.334**
	Sig. (2-tailed)	0.038	0.002	0.085		0.000	0.000	0.000
	N	964	967	966	967	967	967	967

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations								
		On or Off Campus Housing	Male or Female	Collegiate Athletics Participation	Club Sports	Intramural Athletics	NCAA Athletics	Greek Membership
DV: Hi or Low Risk	Pearson Correlation	-0.052	-0.030	-0.001	0.014	-0.039	0.020	0.042
	Sig. (2-tailed)	0.110	0.354	0.980	0.667	0.227	0.538	0.195
	N	964	964	964	964	964	964	964
DV: Hazardous/ non-Hazardous Drinking	Pearson Correlation	-.098**	.087**	0.027	0.003	.069*	0.030	.081*
(AUDIT Risk)	Sig. (2-tailed)	0.002	0.007	0.399	0.937	0.032	0.343	0.012
	N	967	967	967	967	967	967	967
Alcohol Citation History	Pearson Correlation	0.033	0.030	0.055	0.012	0.032	.084**	-0.013
	Sig. (2-tailed)	0.300	0.359	0.085	0.704	0.314	0.009	0.693
	N	966	966	966	966	966	966	966
Freshman	Pearson Correlation	.338**	0.044	0.045	0.011	-0.022	0.028	-0.037
	Sig. (2-tailed)	0.000	0.172	0.162	0.737	0.496	0.391	0.251
	N	967	967	967	967	967	967	967

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations							
		Family History - Environmental	Biological Family History - Alcohol	Biological Family History - Drug	GPA	Current Age	Age of Onset to Alcohol Use
DV: Hi or Low Risk	Pearson Correlation	0.062	-0.001	0.052	-0.021	0.055	-.092**
	Sig. (2-tailed)	0.056	0.969	0.110	0.525	0.089	0.006
	N	964	963	963	950	964	894
DV: Hazardous/ non-Hazardous Drinking	Pearson Correlation	.091**	0.057	.097**	-0.054	.094**	-.119**
(AUDIT Risk)	Sig. (2-tailed)	0.005	0.077	0.003	0.097	0.004	0.000
	N	967	966	966	953	967	897
Alcohol Citation History	Pearson Correlation	0.046	-0.025	0.046	-.072*	0.022	-.080*
	Sig. (2-tailed)	0.149	0.441	0.153	0.027	0.496	0.017
	N	966	965	965	952	966	896
Freshman	Pearson Correlation	0.040	-0.038	-0.015	0.032	-.559**	-.125**
	Sig. (2-tailed)	0.218	0.241	0.638	0.322	0.000	0.000
	N	967	966	966	953	967	897

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations						
		Social Motives	Enhancement Motives	Conformity Motives	Coping-Depression Motives	Coping-Anxiety Motives
DV: Hi or Low Risk	Pearson Correlation	.235**	.259**	.161**	.289**	.267**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000
	N	963	962	962	963	961
DV: Hazardous/ non-Hazardous Drinking	Pearson Correlation	.328**	.313**	.173**	.340**	.306**
(AUDIT Risk)	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000
	N	966	965	965	966	964
Alcohol Citation History	Pearson Correlation	.092**	.100**	.115**	.068*	.115**
	Sig. (2-tailed)	0.004	0.002	0.000	0.034	0.000
	N	965	964	964	965	963
Freshman	Pearson Correlation	-.152**	-0.014	-0.032	-0.006	-.076*
	Sig. (2-tailed)	0.000	0.667	0.316	0.859	0.018
	N	966	965	965	966	964

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations								
		Hi or Low Risk (DV)	AUDIT Risk	Alcohol Citation History	Freshman	Sophomore	Junior	Senior
Sophomore	Pearson Correlation	-0.020	-0.024	0.020	-.224**	1	-.311**	-.334**
	Sig. (2-tailed)	0.528	0.464	0.534	0.000		0.000	0.000
	N	964	967	966	967	967	967	967
Junior	Pearson Correlation	0.001	0.017	-0.030	-.311**	-.311**	1	-.464**
	Sig. (2-tailed)	0.986	0.598	0.347	0.000	0.000		0.000
	N	964	967	966	967	967	967	967
Senior	Pearson Correlation	.071*	.085**	0.059	-.334**	-.334**	-.464**	1
	Sig. (2-tailed)	0.028	0.008	0.069	0.000	0.000	0.000	
	N	964	967	966	967	967	967	967
On or Off Campus Housing	Pearson Correlation	-0.052	-.098**	0.033	.338**	.133**	-.152**	-.239**
	Sig. (2-tailed)	0.110	0.002	0.300	0.000	0.000	0.000	0.000
	N	964	967	966	967	967	967	967
Male or Female	Pearson Correlation	-0.030	.087**	0.030	0.044	0.005	0.012	-0.052
	Sig. (2-tailed)	0.354	0.007	0.359	0.172	0.874	0.709	0.106
	N	964	967	966	967	967	967	967

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations								
		On or Off Campus Housing	Male or Female	Collegiate Athletics Participation	Club Sports	Intramural Athletics	NCAA Athletics	Greek Membership
Sophomore	Pearson Correlation	.133**	0.005	0.003	0.061	0.048	0.028	-0.018
	Sig. (2-tailed)	0.000	0.874	0.922	0.060	0.136	0.391	0.584
	N	967	967	967	967	967	967	967
Junior	Pearson Correlation	-.152**	0.012	0.010	0.026	0.017	0.011	-0.012
	Sig. (2-tailed)	0.000	0.709	0.763	0.428	0.606	0.735	0.713
	N	967	967	967	967	967	967	967
Senior	Pearson Correlation	-.239**	-0.052	-0.049	-.083**	-0.038	-0.056	0.056
	Sig. (2-tailed)	0.000	0.106	0.128	0.009	0.243	0.082	0.080
	N	967	967	967	967	967	967	967
On or Off Campus Housing	Pearson Correlation	1	0.014	-0.008	.067*	.064*	-0.003	0.004
	Sig. (2-tailed)		0.660	0.796	0.037	0.048	0.925	0.909
	N	967	967	967	967	967	967	967
Male or Female	Pearson Correlation	0.014	1	-0.017	-0.027	.204**	-0.006	-0.023
	Sig. (2-tailed)	0.660		0.597	0.395	0.000	0.857	0.471
	N	967	967	967	967	967	967	967

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations							
		Family History - Environmental	Biological Family History - Alcohol	Biological Family History - Drug	GPA	Current Age	Age of Onset to Alcohol Use
Sophomore	Pearson Correlation	-0.015	-0.032	-0.023	-0.040	-.238**	-0.007
	Sig. (2-tailed)	0.652	0.315	0.481	0.213	0.000	0.834
	N	967	966	966	953	967	897
Junior	Pearson Correlation	-0.010	0.021	0.013	-0.061	.098**	.067*
	Sig. (2-tailed)	0.755	0.520	0.692	0.061	0.002	0.043
	N	967	966	966	953	967	897
Senior	Pearson Correlation	-0.011	0.037	0.019	.066*	.559**	0.038
	Sig. (2-tailed)	0.736	0.246	0.563	0.043	0.000	0.260
	N	967	966	966	953	967	897
On or Off Campus Housing	Pearson Correlation	-.088**	-.083*	-0.049	-0.001	-.418**	0.020
	Sig. (2-tailed)	0.006	0.010	0.129	0.970	0.000	0.543
	N	967	966	966	953	967	897
Male or Female	Pearson Correlation	0.048	-0.024	-0.028	-0.009	0.005	0.034
	Sig. (2-tailed)	0.136	0.465	0.391	0.773	0.876	0.316
	N	967	966	966	953	967	897

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations						
		Social Motives	Enhancement Motives	Conformity Motives	Coping-Depression Motives	Coping-Anxiety Motives
Sophomore	Pearson Correlation	0.000	0.059	0.015	-0.008	-0.003
	Sig. (2-tailed)	0.998	0.065	0.647	0.796	0.935
	N	966	965	965	966	964
Junior	Pearson Correlation	-0.003	-0.041	0.053	-0.005	-0.003
	Sig. (2-tailed)	0.926	0.199	0.100	0.880	0.924
	N	966	965	965	966	964
Senior	Pearson Correlation	.128**	0.003	-0.037	0.016	.068*
	Sig. (2-tailed)	0.000	0.928	0.250	0.613	0.035
	N	966	965	965	966	964
On or Off Campus Housing	Pearson Correlation	-.148**	-0.045	-0.035	-0.051	-.120**
	Sig. (2-tailed)	0.000	0.164	0.278	0.110	0.000
	N	966	965	965	966	964
Male or Female	Pearson Correlation	-0.004	0.051	0.062	.079*	0.043
	Sig. (2-tailed)	0.893	0.111	0.054	0.014	0.178
	N	966	965	965	966	964

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations								
		Hi or Low Risk (DV)	AUDIT Risk	Alcohol Citation History	Freshman	Sophomore	Junior	Senior
Family History - Environmental	Pearson Correlation	0.062	.091**	0.046	0.040	-0.015	-0.010	-0.011
	Sig. (2-tailed)	0.056	0.005	0.149	0.218	0.652	0.755	0.736
	N	964	967	966	967	967	967	967
Biological Family History - Alcohol	Pearson Correlation	-0.001	0.057	-0.025	-0.038	-0.032	0.021	0.037
	Sig. (2-tailed)	0.969	0.077	0.441	0.241	0.315	0.520	0.246
	N	963	966	965	966	966	966	966
Biological Family History - Drug	Pearson Correlation	0.052	.097**	0.046	-0.015	-0.023	0.013	0.019
	Sig. (2-tailed)	0.110	0.003	0.153	0.638	0.481	0.692	0.563
	N	963	966	965	966	966	966	966

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations								
		On or Off Campus Housing	Male or Female	Collegiate Athletics Participation	Club Sports	Intramural Athletics	NCAA Athletics	Greek Membership
Family History - Environmental	Pearson Correlation	-.088**	0.048	0.004	-0.001	-.089**	-0.015	-0.009
	Sig. (2-tailed)	0.006	0.136	0.895	0.987	0.005	0.638	0.783
	N	967	967	967	967	967	967	967
Biological Family History - Alcohol	Pearson Correlation	-.083*	-0.024	-0.034	-.094**	-0.029	-0.035	-0.021
	Sig. (2-tailed)	0.010	0.465	0.291	0.003	0.375	0.278	0.523
	N	966	966	966	966	966	966	966
Biological Family History - Drug	Pearson Correlation	-0.049	-0.028	-0.015	-0.052	-0.038	-0.028	-0.008
	Sig. (2-tailed)	0.129	0.391	0.636	0.109	0.235	0.381	0.806
	N	966	966	966	966	966	966	966

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations							
		Family History - Environmental	Biological Family History - Alcohol	Biological Family History - Drug	GPA	Current Age	Age of Onset to Alcohol Use
Family History - Environmental	Pearson Correlation	1	.364**	.211**	0.054	0.011	-.189**
	Sig. (2-tailed)		0.000	0.000	0.097	0.735	0.000
	N	967	966	966	953	967	897
Biological Family History - Alcohol	Pearson Correlation	.364**	1	.448**	0.046	0.038	-0.060
	Sig. (2-tailed)	0.000		0.000	0.154	0.236	0.072
	N	966	966	965	952	966	896
Biological Family History - Drug	Pearson Correlation	.211**	.448**	1	0.020	0.015	-.107**
	Sig. (2-tailed)	0.000	0.000		0.537	0.647	0.001
	N	966	965	966	952	966	896

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations						
		Social Motives	Enhancement Motives	Conformity Motives	Coping-Depression Motives	Coping-Anxiety Motives
Family History - Environmental	Pearson Correlation	.154**	.173**	.093**	.127**	.180**
	Sig. (2-tailed)	0.000	0.000	0.004	0.000	0.000
	N	966	965	965	966	964
Biological Family History - Alcohol	Pearson Correlation	.101**	.078*	.114**	.112**	.106**
	Sig. (2-tailed)	0.002	0.015	0.000	0.000	0.001
	N	965	964	964	965	963
Biological Family History - Drug	Pearson Correlation	.095**	.110**	0.062	.140**	.122**
	Sig. (2-tailed)	0.003	0.001	0.054	0.000	0.000
	N	965	964	964	965	963

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations								
		Hi or Low Risk (DV)	AUDIT Risk	Alcohol Citation History	Freshman	Sophomore	Junior	Senior
GPA	Pearson Correlation	-0.021	-0.054	-.072*	0.032	-0.040	-0.061	.066*
	Sig. (2-tailed)	0.525	0.097	0.027	0.322	0.213	0.061	0.043
	N	950	953	952	953	953	953	953
Current Age	Pearson Correlation	0.055	.094**	0.022	-.559**	-.238**	.098**	.559**
	Sig. (2-tailed)	0.089	0.004	0.496	0.000	0.000	0.002	0.000
	N	964	967	966	967	967	967	967
Age of Onset to Alcohol Use	Pearson Correlation	-.092**	-.119**	-.080*	-.125**	-0.007	.067*	0.038
	Sig. (2-tailed)	0.006	0.000	0.017	0.000	0.834	0.043	0.260
	N	894	897	896	897	897	897	897

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations								
		On or Off Campus Housing	Male or Female	Collegiate Athletics Participation	Club Sports	Intramural Athletics	NCAA Athletics	Greek Membership
GPA	Pearson Correlation	-0.001	-0.009	0.025	-0.047	-0.007	0.045	.069*
	Sig. (2-tailed)	0.970	0.773	0.438	0.146	0.838	0.162	0.034
	N	953	953	953	953	953	953	953
Current Age	Pearson Correlation	-.418**	0.005	-.088**	-.100**	-.065*	-.076*	-0.005
	Sig. (2-tailed)	0.000	0.876	0.006	0.002	0.045	0.019	0.876
	N	967	967	967	967	967	967	967
Age of Onset to Alcohol Use	Pearson Correlation	0.020	0.034	-0.013	-0.033	0.044	-0.041	-0.018
	Sig. (2-tailed)	0.543	0.316	0.690	0.320	0.186	0.217	0.591
	N	897	897	897	897	897	897	897

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations							
		Family History - Environmental	Biological Family History - Alcohol	Biological Family History - Drug	GPA	Current Age	Age of Onset to Alcohol Use
GPA	Pearson Correlation	0.054	0.046	0.020	1	-0.060	0.050
	Sig. (2-tailed)	0.097	0.154	0.537		0.063	0.140
	N	953	952	952	953	953	885
Current Age	Pearson Correlation	0.011	0.038	0.015	-0.060	1	.074*
	Sig. (2-tailed)	0.735	0.236	0.647	0.063		0.026
	N	967	966	966	953	967	897
Age of Onset to Alcohol Use	Pearson Correlation	-.189**	-0.060	-.107**	0.050	.074*	1
	Sig. (2-tailed)	0.000	0.072	0.001	0.140	0.026	
	N	897	896	896	885	897	897

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations						
		Social Motives	Enhancement Motives	Conformity Motives	Coping-Depression Motives	Coping-Anxiety Motives
GPA	Pearson Correlation	-.070*	-0.038	0.015	-.093**	-.071*
	Sig. (2-tailed)	0.031	0.248	0.633	0.004	0.028
	N	952	951	951	952	951
Current Age	Pearson Correlation	.179**	-0.009	0.013	.066*	.122**
	Sig. (2-tailed)	0.000	0.786	0.692	0.041	0.000
	N	966	965	965	966	964
Age of Onset to Alcohol Use	Pearson Correlation	-.131**	-.147**	0.002	-.093**	-.109**
	Sig. (2-tailed)	0.000	0.000	0.952	0.005	0.001
	N	896	895	895	896	894

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations								
		Hi or Low Risk (DV)	AUDIT Risk	Alcohol Citation History	Freshman	Sophomore	Junior	Senior
Social Motives	Pearson Correlation	.235**	.328**	.092**	-.152**	0.000	-0.003	.128**
	Sig. (2-tailed)	0.000	0.000	0.004	0.000	0.998	0.926	0.000
	N	963	966	965	966	966	966	966
Enhancement Motives	Pearson Correlation	.259**	.313**	.100**	-0.014	0.059	-0.041	0.003
	Sig. (2-tailed)	0.000	0.000	0.002	0.667	0.065	0.199	0.928
	N	962	965	964	965	965	965	965
Conformity Motives	Pearson Correlation	.161**	.173**	.115**	-0.032	0.015	0.053	-0.037
	Sig. (2-tailed)	0.000	0.000	0.000	0.316	0.647	0.100	0.250
	N	962	965	964	965	965	965	965
Coping-Depression Motives	Pearson Correlation	.289**	.340**	.068*	-0.006	-0.008	-0.005	0.016
	Sig. (2-tailed)	0.000	0.000	0.034	0.859	0.796	0.880	0.613
	N	963	966	965	966	966	966	966
Coping-Anxiety Motives	Pearson Correlation	.267**	.306**	.115**	-.076*	-0.003	-0.003	.068*
	Sig. (2-tailed)	0.000	0.000	0.000	0.018	0.935	0.924	0.035
	N	961	964	963	964	964	964	964

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations								
		On or Off Campus Housing	Male or Female	Collegiate Athletics Participation	Club Sports	Intramural Athletics	NCAA Athletics	Greek Membership
Social Motives	Pearson Correlation	-.148**	-0.004	0.044	0.009	0.020	0.049	.117**
	Sig. (2-tailed)	0.000	0.893	0.173	0.785	0.525	0.129	0.000
	N	966	966	966	966	966	966	966
Enhancement Motives	Pearson Correlation	-0.045	0.051	0.046	-0.010	0.000	0.055	0.034
	Sig. (2-tailed)	0.164	0.111	0.154	0.761	0.990	0.088	0.295
	N	965	965	965	965	965	965	965
Conformity Motives	Pearson Correlation	-0.035	0.062	-0.006	0.023	0.055	0.015	0.010
	Sig. (2-tailed)	0.278	0.054	0.851	0.469	0.089	0.650	0.766
	N	965	965	965	965	965	965	965
Coping-Depression Motives	Pearson Correlation	-0.051	.079*	0.006	-0.010	0.009	0.031	0.015
	Sig. (2-tailed)	0.110	0.014	0.844	0.758	0.781	0.334	0.633
	N	966	966	966	966	966	966	966
Coping-Anxiety Motives	Pearson Correlation	-.120**	0.043	-0.020	-0.009	-0.016	0.005	0.029
	Sig. (2-tailed)	0.000	0.178	0.542	0.785	0.618	0.871	0.368
	N	964	964	964	964	964	964	964

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations							
		Family History - Environmental	Biological Family History - Alcohol	Biological Family History - Drug	GPA	Current Age	Age of Onset to Alcohol Use
Social Motives	Pearson Correlation	.154**	.101**	.095**	-.070*	.179**	-.131**
	Sig. (2-tailed)	0.000	0.002	0.003	0.031	0.000	0.000
	N	966	965	965	952	966	896
Enhancement Motives	Pearson Correlation	.173**	.078*	.110**	-0.038	-0.009	-.147**
	Sig. (2-tailed)	0.000	0.015	0.001	0.248	0.786	0.000
	N	965	964	964	951	965	895
Conformity Motives	Pearson Correlation	.093**	.114**	0.062	0.015	0.013	0.002
	Sig. (2-tailed)	0.004	0.000	0.054	0.633	0.692	0.952
	N	965	964	964	951	965	895
Coping-Depression Motives	Pearson Correlation	.127**	.112**	.140**	-.093**	.066*	-.093**
	Sig. (2-tailed)	0.000	0.000	0.000	0.004	0.041	0.005
	N	966	965	965	952	966	896
Coping-Anxiety Motives	Pearson Correlation	.180**	.106**	.122**	-.071*	.122**	-.109**
	Sig. (2-tailed)	0.000	0.001	0.000	0.028	0.000	0.001
	N	964	963	963	951	964	894

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations						
		Social Motives	Enhancement Motives	Conformity Motives	Coping-Depression Motives	Coping-Anxiety Motives
Social Motives	Pearson Correlation	1	.633**	.317**	.334**	.519**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000
	N	966	965	964	965	964
Enhancement Motives	Pearson Correlation	.633**	1	.223**	.484**	.615**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000
	N	965	965	964	965	964
Conformity Motives	Pearson Correlation	.317**	.223**	1	.378**	.327**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000
	N	964	964	965	965	963
Coping-Depression Motives	Pearson Correlation	.334**	.484**	.378**	1	.727**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000
	N	965	965	965	966	964
Coping-Anxiety Motives	Pearson Correlation	.519**	.615**	.327**	.727**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	
	N	964	964	963	964	964

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

APPENDIX F

MODELS 1, 2, AND 3 FOR RESEARCH QUESTION 1A

Model 1 for Research Question 1A

	Bβ	S.E.β	Wald's χ^2	Sig.	Exp(B) OR	95% C.I.for EXP(B)	
						Lower	Upper
Constant	-1.785	0.098	332.826		0.168		
Alcohol Citation History (1)	1.379	0.385	12.817	***	3.973	1.867	8.454

Model 1 χ^2 (1) = 11.227**

Note: *denotes p <.05, ** denotes p <.01, *** denotes p<.001, OR=Odds Ratio

Model 2 for Research Question 1A

	Bβ	S.E.β	Wald's χ^2	Sig.	Exp(B) OR	95% C.I.for EXP(B)	
						Lower	Upper
Constant	1.010	2.099	0.231		2.744		
Alcohol Citation History (1)	1.029	0.428	5.790	*	2.799	1.210	6.473
Freshman (1)	-0.974	0.443	4.840	*	0.378	0.159	0.899
Sophomore (1)	-0.317	0.339	0.874		0.729	0.375	1.415
Junior (1)	-0.238	0.251	0.904		0.788	0.482	1.288
On or Off Campus Housing (1)	-0.372	0.232	2.569		0.689	0.437	1.087
Male or Female (1)	0.722	0.263	7.527	**	2.058	1.229	3.446

Collegiate Athletics Participation (1)	0.498	0.809	0.379		1.646	0.337	8.027
Club Sports (1)	-0.058	0.391	0.022		0.944	0.438	2.031
Intramural Athletics (1)	0.840	0.404	4.327		2.317	1.050	5.115
NCAA Athletics (1)	-0.144	0.970	0.022		0.866	0.129	5.798
Greek Membership (1)	0.509	0.314	2.629		1.663	0.899	3.075
Family History - Environmental (1)	0.370	0.216	2.940		1.448	0.948	2.211
Biological Family History - Alcohol (1)	0.051	0.236	0.047		1.052	0.663	1.670
Biological Family History - Drug (1)	0.411	0.226	3.306		1.508	0.968	2.348
GPA	-0.207	0.154	1.813		0.813	0.601	1.099
Current Age	-0.016	0.083	0.039		0.984	0.835	1.158
Age of Onset to Alcohol Use	-0.120	0.042	8.164	**	0.887	0.817	0.963
			Model 2 χ^2 (17) = 63.280***				

Note: *denotes p <.05, ** denotes p <.01, *** denotes p<.001, OR=Odds Ratio

Model 3 for Research Question 1A							
	Bβ	S.E.β	Wald's χ^2	Sig.	Exp(B) OR	95% C.I.for EXP(B)	
						Lower	Upper
Constant	-1.824	2.338	0.609		0.161		
Alcohol Citation History (1)	0.883	0.483	3.350		2.419	0.939	6.227
Freshman (1)	-1.421	0.502	8.008	**	0.241	0.090	0.646
Sophomore (1)	-0.505	0.365	1.911		0.603	0.295	1.235
Junior (1)	-0.247	0.272	0.829		0.781	0.458	1.330
On or Off Campus Housing (1)	-0.263	0.255	1.066		0.769	0.467	1.266
Male or Female (1)	0.700	0.289	5.879	**	2.013	1.143	3.544
Collegiate Athletics Participation (1)	0.572	0.887	0.416		1.772	0.312	10.078
Club Sports (1)	-0.281	0.452	0.387		0.755	0.312	1.830
Intramural Athletics (1)	0.820	0.430	3.644		2.271	0.978	5.273
NCAA Athletics (1)	-0.434	1.067	0.165		0.648	0.080	5.246
Greek Membership (1)	0.354	0.334	1.121		1.424	0.740	2.740
Family History - Environmental (1)	0.135	0.237	0.328		1.145	0.720	1.821
Biological Family History - Alcohol (1)	-0.026	0.259	0.010		0.974	0.586	1.620
Biological Family History - Drug (1)	0.253	0.251	1.022		1.288	0.788	2.105
GPA	-0.068	0.176	0.148		0.934	0.661	1.320
Current Age	-0.054	0.093	0.335		0.948	0.791	1.136

Age of Onset to Alcohol Use	-0.105	0.048	4.801	*	0.901	0.820	0.989
Social Motives	0.589	0.145	16.579	***	1.802	1.357	2.394
Enhancement Motives	0.275	0.150	3.372		1.316	0.982	1.764
Conformity Motives	0.032	0.207	0.023		1.032	0.687	1.550
Coping-Depression Motives	0.770	0.187	16.927	***	2.159	1.496	3.116
Coping-Anxiety Motives	-0.179	0.185	0.939		0.836	0.582	1.201
			Model 3 χ^2 (22) = 163.509***				

Note: *denotes p <.05, ** denotes p <.01, *** denotes p<.001, OR=Odds Ratio

APPENDIX G

MODELS 1, 2, AND 3 FOR RESEARCH QUESTION 2A

Model 1 for Research Question 2A

	Bβ	S.E.β	Wald's χ^2	Sig	Exp(B) OR	95% C.I.for EXP(B)	
						Lower	Upper
Constant	-2.879	0.153	353.198		0.056		
Alcohol Citation History (1)	1.270	0.513	6.119	*	3.560	1.302	9.736
			Model 1 χ^2 (1) = 4.781*				

Note: *denotes p <.05, ** denotes p <.01, *** denotes p<.001, OR=Odds Ratio

Model 2 for Research Question 2A

Step 1	Bβ	S.E.β	Wald's χ^2	Sig.	Exp(B) OR	95% C.I.for EXP(B)	
						Lower	Upper
Constant	1.557	3.222	0.234		4.745		
Alcohol Citation History (1)	0.984	0.559	3.104		2.676	0.895	8.001
Freshman (1)	-1.254	0.702	3.191		0.285	0.072	1.130
Sophomore (1)	-0.710	0.533	1.777		0.491	0.173	1.397
Junior (1)	-0.433	0.385	1.263		0.648	0.305	1.380
On or Off Campus Housing (1)	-0.354	0.356	0.989		0.702	0.349	1.410
Male or Female (1)	-0.247	0.508	0.238		0.781	0.289	2.111

Collegiate Athletics Participation (1)	-2.223	2.648	0.705		0.108	0.001	19.443
Club Sports (1)	0.436	0.526	0.687		1.546	0.552	4.330
Intramural Athletics (1)	-1.224	1.119	1.197		0.294	0.033	2.635
NCAA Athletics (1)	1.757	2.660	0.436		5.796	0.032	1065.198
Greek Membership (1)	0.559	0.451	1.537		1.749	0.723	4.230
Family History - Environmental (1)	0.515	0.328	2.461		1.674	0.879	3.186
Biological Family History - Alcohol (1)	-0.340	0.360	0.895		0.712	0.351	1.440
Biological Family History - Drug (1)	0.476	0.344	1.908		1.609	0.819	3.160
GPA	-0.140	0.240	0.339		0.870	0.544	1.391
Current Age	-0.072	0.129	0.314		0.931	0.723	1.197
Age of Onset to Alcohol Use	-0.136	0.062	4.861	*	0.873	0.774	0.985
			Model 2 χ^2 (17) = 26.04*				

Note: *denotes p <.05, ** denotes p <.01, *** denotes p<.001, OR=Odds Ratio

Model 3 for Research Question 2A

Step 1	Bβ	S.E.β	Wald's χ^2	Sig.	Exp(B) OR	95% C.I.for EXP(B) Lower	Upper
Constant	-1.843	3.557	0.268		0.158		
Alcohol Citation History (1)	0.677	0.654	1.071		1.967	0.546	7.087
Freshman (1)	-1.826	0.752	5.889	*	0.161	0.037	0.704
Sophomore (1)	-1.007	0.572	3.106		0.365	0.119	1.120
Junior (1)	-0.613	0.432	2.014		0.542	0.232	1.263
On or Off Campus Housing (1)	-0.195	0.391	0.249		0.822	0.382	1.771
Male or Female (1)	-0.670	0.559	1.439		0.512	0.171	1.529
Collegiate Athletics Participation (1)	-2.688	3.723	0.521		0.068	0.000	100.436
Club Sports (1)	0.258	0.619	0.173		1.294	0.385	4.351
Intramural Athletics (1)	-1.265	1.114	1.288		0.282	0.032	2.508
NCAA Athletics (1)	2.054	3.722	0.305		7.797	0.005	11472.596
Greek Membership (1)	0.445	0.490	0.825		1.561	0.597	4.077
Family History - Environmental (1)	0.180	0.361	0.248		1.197	0.590	2.431
Biological Family History - Alcohol (1)	-0.471	0.404	1.362		0.624	0.283	1.377
Biological Family History - Drug (1)	0.316	0.386	0.670		1.372	0.644	2.922

GPA	0.108	0.293	0.136		1.114	0.628	1.977
Current Age	-0.110	0.141	0.601		0.896	0.679	1.182
Age of Onset to Alcohol Use	-0.129	0.072	3.180		0.879	0.763	1.013
Social Motives	0.413	0.219	3.576		1.512	0.985	2.321
Enhancement Motives	0.566	0.226	6.251	*	1.761	1.130	2.745
Conformity Motives	0.207	0.267	0.604		1.230	0.729	2.075
Coping-Depression Motives	0.636	0.250	6.451	*	1.888	1.156	3.084
Coping-Anxiety Motives	-0.113	0.267	0.180		0.893	0.529	1.508
			Model 3 χ^2 (22) = 92.398***				

Note: *denotes p <.05, ** denotes p <.01, *** denotes p<.001, OR=Odds Ratio